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08 Illegal Streaming

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50 Keyboards On Test

A good keyboard can make a huge difference not just when it comes to typing but also when playing games. Whatever you need one for, you tend to get what you pay for, so it's worth spending a bit more to get something really good. To help you choose a high-quality keyboard, we're looking at six that cost slightly more than average, but which are actually worth it

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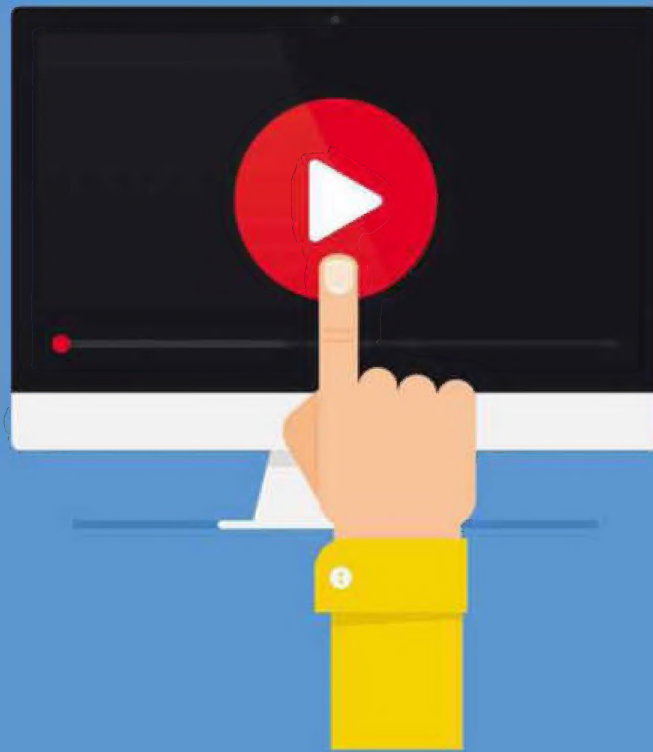
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Watching Illegal Content Online

You can watch sport, movies and television programmes illegally online but what is being done about it?

The 2016 UEFA European Championship in France has been watched by millions of people in the UK for free. That's okay, though, because under a deal struck with European football's governing body, the BBC and ITV have the rights to broadcast the games on free-to-air television – so for the four weeks of the tournament, there is no need to subscribe to a premium TV service, or seek out websites for an illegal feed. Come next month, though, many football fans will play a different game. The Premiership and the UEFA Champions League will be aired on subscription television channels, since forking out for Sky Sports and BT Sport could potentially empty the wallets of many a fan, a good number will seek less-than-legal, but free, alternatives.

Ever since the advent of broadband, scores of fans have flocked online to avoid paying to see 22 men boot a ball around a pitch (and all of the petulance, drama and disappointment which comes with it – yes, some of us are still smarting over England's sorry exit). There

are dozens, if not hundreds, of sites that stream games live and, much like other piracy sites, when one is shut down another returns using a different domain. It's a little akin to a tense penalty shoot-out between the authorities and the streamers – where we all watch on to see which one misses the net and which one hands victory to the other. Only this game just seems to go on and on and on.

Illegal streaming affects many sports, of course, and not just football. Boxing fans avoid pay-per-view feeds by punching in the URL of a streaming site and watching fights for free online. Others look to grab cheeky streams of cricket, golf and rugby. The problem extends even further and wider, though. Illegal streams – and downloads, come to that – blight the film industry, ruin attempts by television companies to charge for their catalogue of shows and annoy concert promoters by allowing people to watch gigs from the comfort of their chair at home. The issue affects sales of DVDs and Blu-rays and it dents the profits of the legal streaming services. Yet so many people still do it.

Indeed, statistics published by the Intellectual Property Office have shown that one in five of us access content illegally. The situation is worse for the film industry, which sees a quarter of users unlawfully streaming or downloading movies and it's only marginally better for television – 21%. It also appears that the wider population is getting increasingly used to finding content online. Legal and illegal content consumption online was up 6% last year so, if anything, the problem is only going to intensify – and it is already said to be costing the UK economy somewhere in the region of £1.2 billion each year.

Playing Ball

When it comes to illegal viewing, the stakes are very high. The current Premier League football deal struck by Sky Sports and BT Sport is worth £5.1 billion alone over the next three seasons. So, with more money involved than at any time in the history of televised sport, the powers-that-be are understandably keen to protect their investments.

They want to clamp down on the peer-to-peer networks and the websites which are showing live football matches – something which breaches the copyright held by the Premier League in their broadcast rights. They want to prevent people bypassing pay-per-view events and they want to stop people accessing the expensive multi-million pound TV shows and movies that encourage people to subscribe to premium channels and streaming services. And they'll go to court to stake their case.

Three years ago, Gary Goodger was given a suspended sentence, unpaid work and a £1,750 fine for running a slick streaming operation from his home near Reading. Using a satellite dish,

nine decoders and seven computers, he illegally made live Premier League streams available on inexpensive subscriptions that were processed via PayPal by an accomplice called Jack Bannister who lived in Burnley. After an investigation had been launched by the Federation Against Copyright Theft (FACT), the court case followed a number of 'cease and desist' notices that were ignored.

“ 21% would stop infringing content if everything was available legally ”

The following year computers and other equipment, said to have been supporting a great number of illegal streaming sites allowing users access to sporting events from across the world, was seized from a base of operation based in Cheetham Hill, Manchester. However, despite such efforts to stop the streamers, set-ups such as that appear to be proliferating. Thousands of people are streaming sports feeds without permission and they are increasingly based outside the UK.

Across Europe and the wider world – most notably in Australia, New Zealand and the United Arab Emirates – the black market in streaming and downloading visual entertainment is flourishing, and it is also becoming rather more sophisticated and well-manned. This was evident in Spain last year, when the streaming sports index Wiziwig

The screenshot shows the LIVESPORT24 website, which offers live streaming of various sporting events. The header includes the site name, a navigation bar with categories like LIVE STREAMS, FOOTBALL HIGHLIGHTS, FOOTBALL DAILY, and LIVESCORES, and a list of sports including FOOTBALL, TENNIS, HOCKEY, BASKETBALL, HANDBALL, VOLLEYBALL, RUGBY, BASEBALL, MOTOR SPORTS, and OTHER. The main content area features a large video player showing a tennis match between A. Zverev and P. Mathieu at Wimbledon, with a caption 'The French suffered an nasty fall last week'. To the right of the video is a list of other tennis matches and their status (e.g., 'The French suffered an nasty fall', 'Them looking to get back at Mayer'). Below the video player is a search bar and a list of live events for Tuesday (28 June), including Bowls - Grand Prix 2016, Table Tennis - ITTF Challenger Series, ITF Men's - Albinea, ITF Women's - Banja Luka, ITF Women's - Torun, Swimming - Latvian Championship 2016, ITF Women's - Stuttgart-Vaihingen, Beach Volleyball - Porec Major, and ITF Women's - Middelburg. The website also features several advertisements, including a '10Bet' ad for a '€200 FIRST DEPOSIT BONUS' and a 'bet365' ad for a 'No 1 FOR SPORTS' promotion.

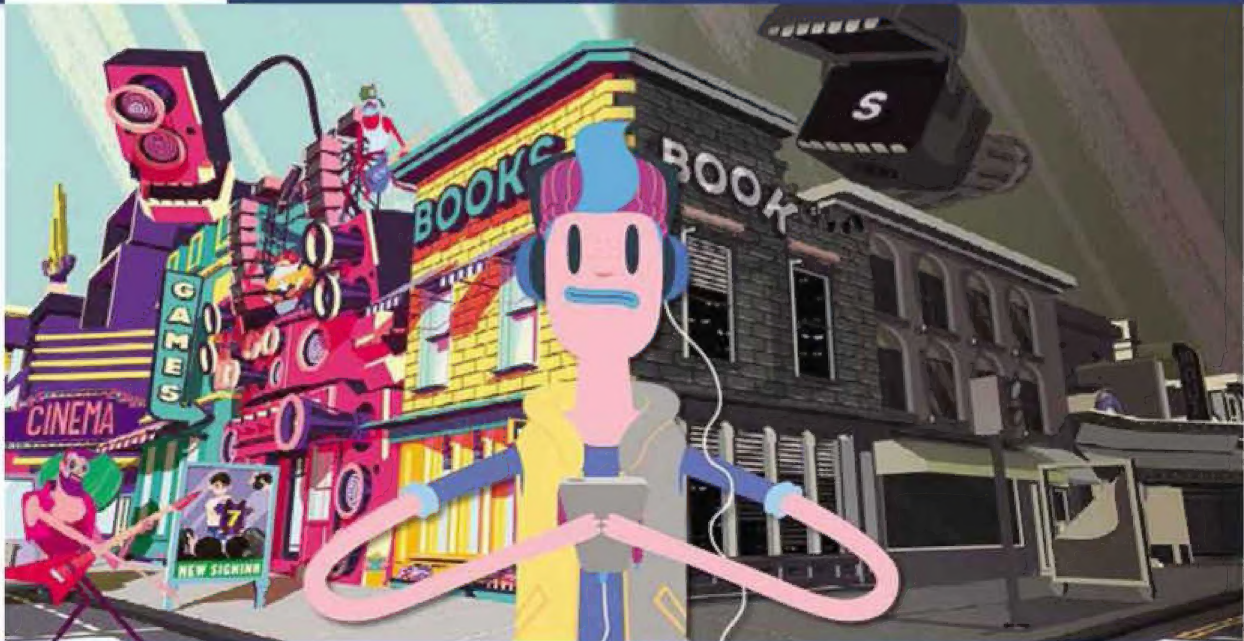
▲ Just one of the many websites which offer live streaming of various sporting events

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Where Can I Get Legal Streams?

There are many legal websites offering streams and downloads of television shows and films, and there are also resources that you can use to point you in the right direction when you're looking for something specific.

If you want to be protected from any potential legal trouble, then it is worth heading over to **Getitrightfromagenuinesite.org**. The site lists genuine websites that offer television, film and sport.

The site is easy enough to use. You simply select the type of content that you want – it also lists games, magazine, ebook and music sites – and then decide the kind of service you are after.

For example, if you want a movie you can select a service that will let you buy and keep it, or opt for something subscription based. It will show you the various hubs available from the BBC iPlayer and UKTV Play to Netflix and Picturebox.

For those wanting to search for a specific film, head to **Findanyfilm.com**. By inputting the name of a movie, you are able to discover whether its available on a streaming service or to buy.

However, both it and a similar service called WhereToWatch, which was set up by the Motion Picture Association of America, recently – sadly – dropped Netflix from their lists because the streaming service retired its API.

was shut down after pressure from anti-piracy organisations and new laws put the squeeze on the operation. It had been streaming the Premier League live and hosting streams to lots of other events. However, when it was shut down, a dozen former moderators simply moved on and formed another service called Streamhub.

"We came back under a new name," one of them said, defiantly, underlining the extent of the problem. Yet, even before they managed to get back online, other alternative sites had already been flagged by those desperate for their football fix. It would seem that supporters of Wiziwig believed there was no wrongdoing – indeed they put what they were doing in the same

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Account Sharing

There is a grey area surrounding the sharing of passwords for accounts; something that allows various users can gain access to a service even though only one person is paying for it. Most legal streaming services allow their films, programme and sports to be beamed on more than one device and, while they tend to cap it at a certain number, don't stop someone in more than one house from sharing an account.

A report in *Variety* last year said that the practice could be costing video-on-demand companies more than £500 million. For that reason, some providers offer family plans so they can at make some extra cash but, while excessive sharing does typically violate the terms and conditions of an agreement, the lack of a firm disincentive doesn't put people off.

We were surprised when, for example, Sky allowed people to stream Sky Sports through a games console which suddenly made it possible for people to hook into someone else's account (with their permission) and enjoy top sporting events for free.

Nowadays it charges an extra £5 a month for Sky Go Extra, which allows shows on up to four compatible mobile devices and one console. That's still offering a surprisingly inexpensive way for some people to share the benefits of a single subscription, though.

bracket as other disruptive companies, from Uber to Spotify. Yet, with each game costing TV companies around £6.6 million, there is much at stake and, if left untackled, it could even threaten the current viability of a Premier League that is now very much reliant on money from television.

"It is only through legitimate investment in our broadcasting rights that we can put on a world renowned football competition, and support and invest in the entire English football pyramid and beyond," a spokesman for the Premier League told us.

"This model is threatened by piracy, whether in the form of illegal internet streams showing Premier League football, or unauthorised broadcasts of our matches in UK pubs. We do a huge amount to combat that threat, including through partnerships with agencies including Net Result, Irdeto and ID Inquiries.

"Our work in this area includes successfully blocking tens of thousands of streams that were illegally showing Premier League footage, and successfully taking legal action against certain websites, both in the English and overseas courts."

Going For Goal

In February, it emerged that Premier League bosses had begun talking to online security companies in the fresh hope of finding ways to crack down on illegal streams. They believe that by preventing users from accessing content available in other regions, they can cut off a good proportion of websites offering unlawful content. To do this, they would employ geofencing, a feature within a program that uses the GPS satellite network, wi-fi nodes and Bluetooth beacons to wrap a virtual boundary around a location

Whether it will work depends on how much energy people have to fight back – and, given that there are a million people determined to watch for free each week in the UK, that's some attack to defend against. Although there are some cheaper ways

of gaining access to some football – Now TV has day passes, for instance, and there are clips available through *The Sun* and *The Times* – the problem is that once someone has gotten used to obtaining something for nothing, it is hard to get them to move to a payment system. Besides, a lot of fans will argue that they are trying to gain access to games they simply can't find televised at home: games that kick off at 3pm on a Saturday are a case in point. In that case, it's an issue of availability.



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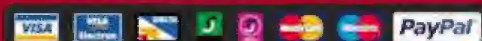
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The screenshot shows the official website of the Premier League. At the top, there's a navigation bar with the Premier League logo, the text 'THE OFFICIAL WEBSITE OF THE PREMIER LEAGUE', and links for 'Tickets', 'Broadcast Schedules', and 'FANTASY PREMIER LEAGUE'. Below this is a match schedule for Saturday 13 Aug 15:00, listing matches like ARS v LIV, BOU v MUN, BUR v SWA, etc. A red navigation bar contains links: HOME, MATCHDAY, NEWS & FEATURES, CLUBS, PLAYERS, COMMUNITIES, KIDS, and VIDEOS. The main content area is titled 'NEWS & FEATURES' and features an article dated Thursday 07 November 2013, titled 'League and FACT combine to convict on illegal streaming'. The article text states: 'FACT successfully brings case against website making unauthorised broadcasts'. There is a large image of a football match in progress. To the right of the image is a 'Key Points' box with three bullet points: 'League works with FACT to convict men of copyright offences in relation to illegal streaming of Barclays Premier League matches', 'Website made unauthorised broadcasts of live Barclays Premier League matches', and 'Criminal received two-year jail sentence, the first time for such a crime'. Below this is a 'Related Links' section with one link: 'League aids police in conviction of men behind illegal streaming site'. On the far right, there's a sidebar with social media links (37M, 11.8M, Follow) and a vertical list of restaurant logos: hungryhouse, Anna Tea, The Star grill, and Tandoori Nights.

▲ The Premier League has long made an effort to stamp out illegal streaming of football matches

Although 49% of respondents to a survey by the IPO (Intellectual Property Office) said they watched unlawfully because it was free, and another 43% said they did so because it was convenient. It goes without saying that if you can't readily get hold of some content and you are desperate to see it, then you may take desperate measures.

In the case of football, there is a valid reason for not showing games in the 3pm Saturday time slot in the UK: the idea is that it encourages supporters to leave their armchair and go and see some live football in a stadium. Certainly, the Football League is keen to protect the numbers of supporters who go to watch Championship, League One and League Two football, where most games continue to be played in English football's most traditional time slot.

However, when the clock comes round to that traditional kick-off time, the number of people looking to stream football hits its peak. The Premier League could insist on allowing every game to be broadcast live on television to counter this – the IPO survey claims 21% would stop infringing content if everything was available legally – but that is not going to be on the cards for at least three more seasons.

Geographical Restrictions

Football, though, is not the only industry with restrictions. Netflix, Amazon, YouTube and the BBC iPlayer have become the most dominant and popular lawful streaming services online today but they come with their own boundaries. With Netflix, customers in

the UK can only access content that is available in this country but, as many will know, there are many shows available on the American service that are appealing. There have been various attempts to get around that – using unblocking tools, VPNs and proxies – but Netflix took steps to close the loopholes, barring viewers from seeing scores of licensed films and television shows.

"We have a way to go before we can offer people the same films and TV series everywhere," Netflix VP David Fullagar said in a blog post. And yet the difference between the two services is huge as it stands. The latest figures show that the US Netflix has 6,389 movies and shows while in the UK there are 3,701. To watch the programmes that are not available here, some people may well be tempted to scour the web instead. The same goes for accessing shows such as *Game Of Thrones* without a Sky Atlantic subscription, or a programme that was aired on the BBC and can't be found officially.

There is no doubt that those who insist on watching for free can be said to have a sense of entitlement – the feeling that if we can't get what they want, they'll find it anyway and get it for free. Whatever their motivation, it's illegal; it's also a very profitable business for many. Paul Mahoney from Carnhill in Derry Northern Ireland, made close to £300,000 through adverts placed on illegal websites that offered users access to the latest film and television shows. At his peak, he was making more than 12,000 films available to his customers for free, and many of those were showing at the same time – or before – they were on at the cinema.

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This kind of high-speed internet piracy has taken over from the 'hard-goods' equivalent, which so worried the movie and television industry in days gone by. People tend not to snap up dodgy DVDs from a car boot sale or the pub any more, just as they don't nip down to the local Blockbuster – both are ideas from a bygone age. Downloads and streams are far more convenient, yet equally unlawful. As before, though, the people who tend to be fined or prosecuted are those provided the 'service' – nobody in the UK has yet been hauled before the court for illegally streaming content.

That's because, according to FACT, the strategy is not to prosecute those who are streaming at home. Instead, those thought to be downloading and streaming illegally are identified by ISPs and sent letters threatening to cut them off if they continue. The main target is the supply. "Our interest lies in identifying, disrupting and if necessary prosecuting the individuals who defraud the creative industries by knowingly stealing content – and who then make that content available through illegitimate means for their own financial benefit or kudos," it has said. Broadband providers have also been taking action to cut off sites they suspect of providing illegal content.

Watching The Pirates

A few companies have also sprung up to help monitor online activity for anything unlawful. Mark Monitor is one of them and it has been helping, among others, World Wrestling Entertainment (WWE) to spot any online videos of matches. Lots of streaming sites have been taken down as a result, but there has been controversy within the wrestling world over attitudes towards streaming and downloading. One wrestler actually asked Twitter for a link to an illegal stream of a UFC pay-per-view match, for example.

The City of London Police Intellectual Property Crime Unit (PIPCU) has also been set up in recent years with £2.56m funding from the IPO. Running until next year, it has been successful in disrupting and preventing websites from providing unauthorised access to copyrighted content. With FACT among its partners, it has been encouraging the creative industries to identify and report copyright-infringing websites. These are then listed on an Infringing Website List and shared among the creative industries. The idea is that word gets around that these sites are dodgy so that advertisers, agencies and intermediaries stop advertising on them. Pulling the plug on their cash source is seen as the way forward.

Even so, it is still a tricky area to police. Whereas pre-recorded footage and files ready for download can be easily identified by the files that need to be stored, streaming something live is transient. There is less of a trace and with the rise of smartphone apps that allow for live streaming this is becoming more of an issue. So prosecutions for downloading and streaming films and television programmes are more likely than for those who are showing live events such as football matches.

It's also hard to prosecute under the Copyright, Designs and Patents Act 1988 because it could – and it has been – successfully argued that the images being beamed are not intellectual creations. The US Digital Millennium Copyright Act, on the other hand, can see companies and individuals calling for content to be removed.

Yet it's all very grey, much to the frustration of those who are trying to stamp out downloading and streaming that is being carried out without permission. A lot depends on what is dotted around the website – FACT says illegal streaming sites can use trademarks and cover art and so sites can be targeted for that reason. Perhaps more worrying is that they can also look so professional that it can be difficult for a visitor to know whether they are legal or not. The danger here is that there are some hidden 'extras' lurking beneath the shiny veneer (see the boxout) but even if there isn't, it can still be very damaging.

Why Live Streaming Can Be Dangerous

Aside from the moral issue of illegal streaming, users need to be aware that taking a live feed can actually introduce malicious software on your computer. A study by researchers at Stony Brook University said little is known about the people who initiate the feeds and maintain the websites that link to them and that is putting people in danger.

It identified 5,685 free live streaming domains and performed 850,000 visits. In the process, it analysed a terabyte of traffic. The findings were an eye-opener. Since the sites find it difficult to encourage legal advertisers, they are increasingly funded by malicious ads. On half of the sites studied, those adverts were planting malicious software on to computers.

Add to that the number of streaming sites that insist on a browser-plug in which can infect any website being visited and it becomes clear that live streaming can be a precarious business – for the user. "On the one hand, our analysis reveals that users of free live-streaming websites are generally exposed to deceptive advertisements, malware, malicious browser extensions, and fraudulent scams," the report said.

"On the other hand, we find that free live-streaming parties are often reported for copyright violations and host their infrastructure predominantly in Europe and Belize." The study looked at both the sites that directly serve up the streams and the aggregators that link to them.

Ultimately, anyone using an illegal streaming website has to consider what they are doing to the various industries. While a lot of people may not have too much sympathy with the Premier League given the cash numbers that are being thrown around, there could still be an adverse effect on the clubs which benefit from the money, although you'd hope there have been some lessons learned from the ITV Digital debacle of 2001. Back then, the ITV Sports Channel showed the purchased TV rights to the Football League, but when the whole venture collapsed the £315m deal evaporated, severely affecting the budgets of many clubs. It shows how reliant on television clubs are.

In terms of the movie and television industry, though, the impact can be felt beyond the £500 million said to be lost each year due to copyright theft. Less money means fewer resources for the films and programming we love the most which ultimately reduces the overall pleasure of the entertainment industry. Yet while subscription-based services such as Netflix and Amazon are allowing millions of people access to vast amounts of content for a set price each month, there appears to be no happy ending in sight for some industries.

It hasn't helped that football, for instance, is split across two stations which means anyone looking to watch the entire run of the Premier League, FA Cup, Football League Cup, Champions League and Europa League has to take out two subscriptions. It doesn't help either that films at the cinema are not streamed legally within a far shorter time frame or that some shows – such as the brilliant *Detectorists* – can have one season on Netflix without any extra charge, and the second on Amazon at £1.89 an episode.

What that shows is that there has to be a fresh overall look at how content is made available in the future and a concerted effort for global rights. Only then can we hope to see the final whistle blown. [mm](#)



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Train Your Brain

Give your cognitive powers a boost with brain training apps on the web, PC and mobile. **Roland Waddilove** shows what you need to think smarter



They say you only use 10% of your brain's capacity and that if you could use 100%, you'd be a genius that would make Einstein look dim. Wouldn't it be amazing if we could use more of our brain power? Brain training websites and mobile apps have all claimed that by using them you can build up your cognitive abilities, boost your IQ and become a lot smarter than you are right now. They say that they combat the effects of aging, make you better at work and help you become better problem solvers.

They say that the brain is like a muscle, and just as you would go to the gym and lift weights to train your muscles to do more, you can perform mental exercises to train your brain to do more too. By spending just 15 minutes a day on some simple games, you can boost your brain power way beyond its current level.

Unfortunately, the reality is a bit different. Brain training cannot prevent or alleviate dementia and alzheimers in old age or any other medical condition, as was once claimed by those who sold brain training systems. It cannot boost your IQ, and it cannot make you

use more of your brain. That 10% brain figure is a myth anyway. At least that's what the scientists who have studied brain training tell us.

This doesn't mean brain training is useless or pointless. Quite the opposite: engaging in activities that make you think hard in many different ways is beneficial to the health of your mind and your brain. Just take any medical claims with a large pinch of salt.

Challenging your mind makes new connections between the neurons in your brain, so any type of activity, such as completing crosswords, playing a musical instrument, solving logic puzzles and so on, can enhance your brain. The activities in brain training schemes are designed to provide mental challenges, so they're good for you, but not necessarily better than other mentally challenging activities.

You only get better at whatever you practise, so if you practise addition and subtraction in a brain training game, you'll get better at it. However, it won't make you any better at multiplication and division. You'd have to practise those too. Use a brain training

system, and you can see that your scores increase from week to week. This isn't because you're getting smarter or your IQ is increasing; it's because you're getting better at the games you're playing. Play any game, and after a couple of weeks you'll be better at it than when you just started.

The skills learnt in a brain training game do not necessarily apply to other activities, and for this reason the best systems provide a wide range of different activities, so you practise as many different skills as possible. The hope is that some might transfer into real life. This isn't guaranteed, and it depends on the activities. It's easy to see how some brain training activities are useful. Mental arithmetic, for example, can help in everyday life, such as when you need to add up your shopping bill as you go around a supermarket.

Think of brain training activities mainly as a form of entertainment, but also as a way of sharpening certain skills through a series of fun, mentally and physically challenging games.

Websites

There are many websites with brain training apps, and in addition to dedicated websites, you can find useful apps in sites that feature collections of online games. Here are a few sites worth checking out.

Brain Metrix

Rating: 5/10

URL: brainmetrix.com

Brain Metrix is a website that provides a collection of brain training games to exercise your mind. Many of the best brain training games require payment or a subscription, but here they're free. It provides around 20 different games and some of them are well known classics, but others are simple tests of memory, reflexes and logic.

Among the classic games is chess where you play the computer. Chess is a great game for stretching your mind and making you think. It isn't aimed at chess experts, so don't expect grand master level play, but it's challenging for casual players and it certainly makes you think. Sudoku is another classic, but Brain Metrix's version is poor and there are better alternatives. Rubik's Cube is great and it's a 3D object on the web page that can be manipulated just like the real thing by grabbing it with the mouse and rotating the cube and faces. Tower of Hanoi is the classic logic puzzle where you must move disks from one pile to another using three posts. The web version works well.

Don't Believe The Claims

Some brain training companies have been known to exaggerate the benefits of their programmes, but you should be wary of claims that they can have any effect on medical conditions, get you a better job or increase your IQ.

Lumosity is one of the biggest and best-known brain training companies, with web apps you can run on your PC and mobile apps for phones and tablets. It's said to have around 70 million members, and the company's brain training was widely advertised on television and radio in the US.

It got a bit carried away with its claims, though, and said it could do all sorts of things that brain training games have never been proven to do, such as alleviate the symptoms of dementia, strokes and brain injuries. The company was fined \$2 million by the US Federal Trade Commission for deceptive advertising claims that could not be backed up by science (bbc.co.uk/news/technology-35241778).



▲ Brain Metrix has a mixture of classic games and simple brain training exercises

There are many other games and some are very basic, such as one game that tests your reflexes. A square changes colour and you click the mouse as soon as you see it. In a related game the square appears at random in the grid, so you must move the mouse and click. There are memory games in which you turn over cards and try to find matching pairs, colour games and maths problems.

The presentation is plain and simple, some of the games are basic, and it doesn't track your activities or progress. It's far from the best, but it's free.

Mind Games

Rating: 6/10

URL: mindgames.com

Mind Games provides a collection of online games that run in the browser, and they're colourful, graphical and entertaining. The presentation is excellent, and the site is a lot of fun. There are too many games to list, so here are just a few examples.

Brain Trainer has four categories of games: memory, reaction, logic and focus. In each of these are two games. It challenges you in a variety of ways. For example, one game has coloured circles, and in each circle is the name of a colour. You have to click circles where the name matches the colour. In another game, there are tiles. Several will turn over at random to show a colour and then turn



▲ Some of the brain training games at the Mind Games website are quite good



▲ *Neuronation's website has a good range of games, and it tracks your progress*

back. You need to remember and click them. Brain training games sound easy, but they're designed to confuse you and put you under pressure so you make mistakes.

Brain Waves has seven games that challenge your speed, accuracy, perception, reactions, multitasking, memory and coordination. Some of the games seem more like physical challenges than mental ones, such as a game where you need to move the mouse over objects that appear on the screen as fast as you can. Some do make you think, such as 3D objects that are presented at different angles and in different colours, and you have to find the matching pair. A nice feature of this game is that it tracks your score, which you can post on Facebook.

Brain Workout is similar in style. The games have nice graphics and simple animation that make it entertaining. There's a small collection of games, including a maths workout with addition, subtraction and multiplication; a game that involves keeping track of the number of fish in a bucket; a money game in which you have to calculate the amount of change when you buy goods; and several more. The games are basic but fun for a few minutes.

There are many more brain training games at this website, and the range and variety are good. They're individual games and are not part of any training programme, though.

Neuronation

Rating: 8/10

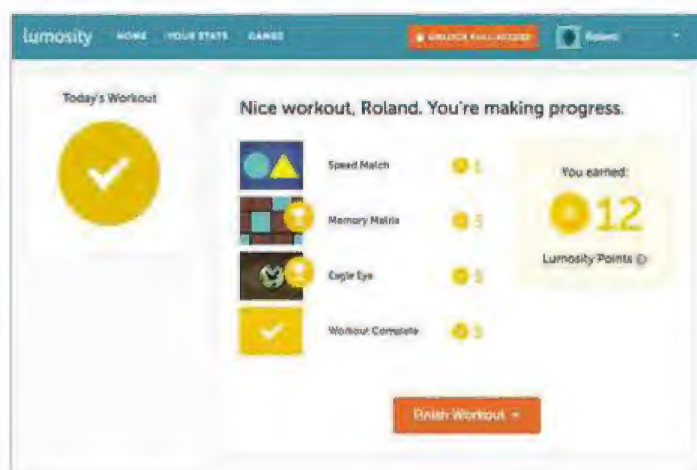
URL: neuronation.com

Neuronation is in a different league, and instead of a collection of separate games on a website, it's more of a complete service. Visit the website, and you're first asked a series of questions about how often you exercise, what your goals are for brain training and so on. A personalised training programme is then created, and you can sign into the site with an email address or by using Facebook login.

You start by playing three simple games, such as connecting circles and clicking on meanings and colours. After an evaluation, recommendations are given, such as taking an intelligence course and how many exercises a day and a week you should do.

The site makes its money from subscriptions, which is £48 if you sign up for 12 months or £199 for a lifetime membership. That's a lot of money, so you'd have to be really keen to want to pay that for brain training. However, it isn't that different to what you would pay elsewhere.

Before signing up, explore the free content first. There are categories for numeracy, language, reasoning, memory and perception. One or two brain training games are free in each



▲ *Lumosity's website is excellent, and it presents new games every day and tracks progress*

category, while the rest, sometimes more than a dozen, are available to subscribers. The games are excellent, the presentation is good, and they really make you think. Your progress can be tracked in your profile. There's a social side too: you can invite friends and exchange messages.

Neuronation is excellent. Although there are some free games, you'll get the most benefit if you subscribe.

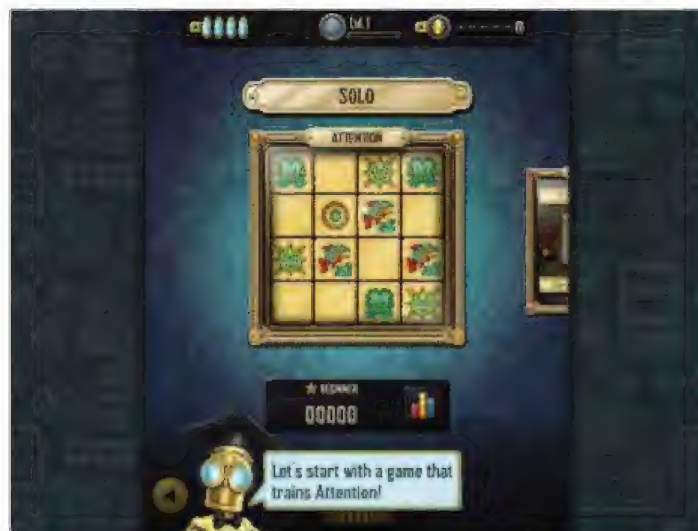
Lumosity

Rating: 9/10

URL: lumosity.com

Lumosity is one of the biggest and best-known brain training companies, particularly in the US where it has been featured on TV and radio. Visit the website, and your first task is to sign up, which you can do most easily with a Facebook account. Unlike Brain Metrix and Mind Games, Lumosity tracks your progress, the games you have played, your scores and achievements.

There are three games to play each day, which take about five minutes to complete. Some of them are traditional brain training games, such as one where there's a grid of tiles, some of which flip over for a second and change colour. You must memorise the ones that flip and then click them afterwards. Other games are very unusual, like the one that shows a photo of a woodland scene. A bird appears somewhere, and a number appears elsewhere. You



▲ *Clockwork Brain is a great brain training game from the Windows Store*

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then have to click where the bird appears and select the correct number, so you need to both see and remember two things that flash on the screen.

The quality of the games at the Lumosity site is excellent, and the brain training programme is well thought out. There's a daily schedule and daily games, and as you complete them they're ticked off. There's progress monitoring and achievements, and lots of scores to monitor your efforts. It's really well thought out.

Like Neuronation, access is limited for free, and you'll get the most out of it by subscribing. All the features and games can be unlocked for £7.95 a month, but signing up for two years reduces the cost per month to £2.50 (£59.95 total). There are lifetime and family memberships too. The two-year membership is recommended.

Software

There's a small collection of brain training apps in the Windows Store, and two of the best are examined here. Both are free, although there are paid upgrades. You need Windows 10 or 8.1 to run them.

A Clockwork Brain

Rating: 9/10

Source: Windows Store

A Clockwork Brain is a brilliant App for Windows 10 that's well worth adding to your collection of brain training resources. It contains 17 mind-stretching games that exercise your memory, attention, reasoning and dexterity skills. It's free to download, and most of the content is free, although there are in-app purchases to gain access to extra items.

There are games like Attention, in which graphics are shown on tiles in a grid, and you need to click the odd one out as fast as you can. In Label It, you see a silhouette and must identify it and click the name among several possibilities. In Dexterity an object is shown, then conveyor belts scroll left and right and you must match silhouettes again. In another game you must identify the smallest of several objects and then press the arrow in which it's pointing.

The graphics are excellent and have a sort of steampunk look to them. Your guide through the app's games is a brass robot and the whole look and feel of the app is great. The games are fun and it tracks your progress. This is recommended if you have Windows 10.

Mind Games Free

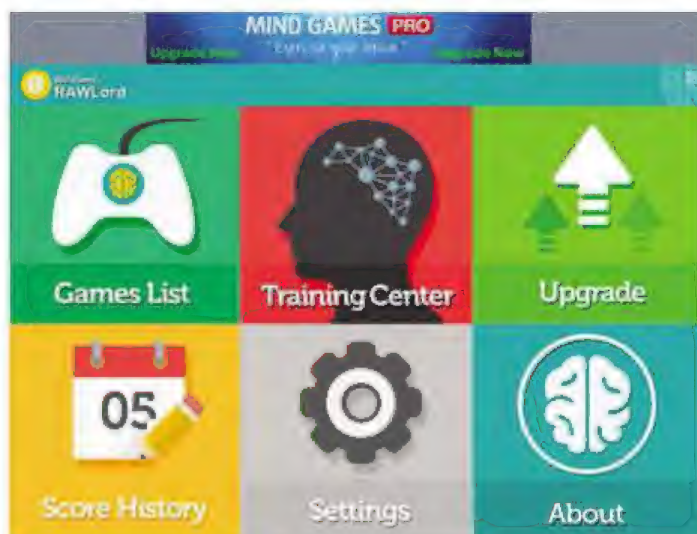
Source: Windows Store

Rating: 8/10

Mind Games comes in free and paid versions. Both contain the same number of brain training games and there are 25 in each, but in the free app only seven can be played an unlimited number of times. The remaining 18 can be played three times before they're locked. This is fair enough and you can try everything before handing over £3.89 for the full version.

The 25 games cover subjects like memory, vocabulary, speed, trivia, maths, verbal concepts and more. Some of the games are really hard and in Word Memory you have seconds to memorise dozens of words. Words then appear on the screen and you must say whether or not they were on the list. It's far too hard. Others are easier, like Memory Racer in which coloured tiles appear and you must say whether the current one matches the previous one, and Attention Training in which you must focus on the direction of an arrow in the centre of the screen.

With 25 games there's a lot to keep you occupied. The graphics are mostly quite simple, although it does contain a few photos in matching games. It's considerably cheaper than the website subscriptions, which may make it tempting.



▲ There are lots of games to keep you busy in Mind Games from the Windows Store

Mobile Apps

Brain training is a big market on mobile, and there are dozens of brain training apps. This is because smartphones are perfect for this type of application. Brain training consists of quick and simple games you can tap with a finger, and with a phone you can play anytime anywhere.

Websites like Lumosity and Neuronation have apps you can run on your Android or iOS phone, and they're almost exactly the same as the websites. You get the same games, same progress tracking and so on. There are also mobile versions of the two Windows 10 apps – Mind Games Clockwork Brain. A good feature of these mobile apps is that your progress and scores are synced, so you can play brain games online, on your phone or in Windows.

Nearly all the brain training apps on mobile are good, and you can't really go wrong with them. Search for 'brain training' in the Google Play store or Apple App Store on your phone, and dozens of apps are listed. Some of the best include Peak, Elevate, Brain Yoga, Fit Brains and Memorado, but there are many more. In most cases you get a few brain training exercises for free, and there are in-app payments or subscriptions to unlock the rest of the content. [mm](#)



◀ Peak is one of dozens of excellent brain training apps for your phone

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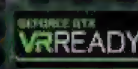
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Are you in danger of falling for Facebook's Like farmers?

Sarah Dobbs investigates what's going on when a seemingly innocuous post attracts thousands of likes...





Quick, name a Facebook scam someone on your friends list fell for today. Got one? By now, most people have wised up to messages from foreign princes who just need your bank details to help them transfer their millions into the country. And most of us have also figured out that any app that claims it'll show you who's clicking on your Facebook account and reveal friends with secret crushes on you is actually just malware.

But there's a weird phenomenon that's clogging up our Facebook feeds at the moment, propagated mostly by less savvy Facebook users. We're talking about those bizarre games or challenges that ask Facebook users to answer easy questions, claiming that they're difficult and that 'most people' will fail them. Examples doing the rounds include questions like 'name a band without the letter T in their name' or simple maths problems. Originally posted by someone you've never heard of, you'll see graphics or posts shared into your timeline, with one of your friends gleefully showing off their intelligence by answering the question that supposedly no one can.

A similar, though not exactly identical, kind of dodgy meme involves a picture that comes with instructions – generally, a photograph of a woman with numbered instructions that involve either pressing something on your phone or typing a word as a comment and then waiting for something to happen. Exactly what's going to happen usually isn't specified, beyond the fact that you won't believe it. But if you've ever given in to curiosity and followed the instructions, you'll have discovered that nothing happens, except that the post in question gets hundreds of comments.

Sometimes, the post is even simpler than that: there won't be a question or instructions, just a request to Like

something really obvious. Ever seen someone engaging with a post that's just a picture of a kitten that says 'Like if you love cats'? Or 'Like if you're not racist'? Or even, 'Like if you hate cancer'? Yeah, those are all examples of the kind of thing that we're talking about here.

So what are these things? Well, sometimes they might just be a bit of fun. Sometimes, they might just be something daft someone made to see how far it could spread and how gullible people can be. But more often than not, they're something a lot sneakier and a bit more sinister.

They Want Your Likes

Basically, it all comes down to gaming Facebook's algorithms via Like farming. To understand why it happens, you need to understand how Facebook treats pages. Over the last few years, the social

The actual mathematics behind the algorithm are known only to Facebook, in much the same way as no one knows exactly how Google decides which sites should appear where in its search results. What we do know is that Facebook uses machine learning to constantly tweak and improve its rankings – and that an awful lot of different things are taken into account, like how many people have Liked a post, how many people have hidden it, how many have commented, as well as how many times you personally have interacted with a page or with a type of content in the past.

Different factors are given different weights, but in the end, it comes down to the fact that the more you interact with someone or something on Facebook, the more you're going to see posts from them in future. And that means the system is open to abuse.

“ It's totally against Facebook's rules to sell a page, and if they get wind of it, the page will be removed ”

network has shuffled and reshuffled the way it displays content. You'll probably already be aware of that fact that your News Feed doesn't just show you what your friends and Liked pages have posted, in chronological order. By default, it shows you what it deems to be Top Stories, in the order it thinks you'll be most likely to engage with it, and some posts, even by pages you've subscribed to, will never appear in your feed at all.

That's a minor irritant for you, but for brands, it's a major headache. Facebook has become one of the main ways a brand can reach its intended audience, to the point where it's almost weird if a brand doesn't have a Facebook page. But just having thousands or even millions of Likes on Facebook doesn't necessarily mean much if Facebook isn't letting those people see your posts. By way of example, one page I manage has over 800,000 Likes, but some posts only get seen by around 10,000 of those people, while others have a reach of over 200,000. Partly, that's because some content gets shared by more people, but partly it's down to those pesky algorithms that decide who gets to see what content.

Facebook Farming

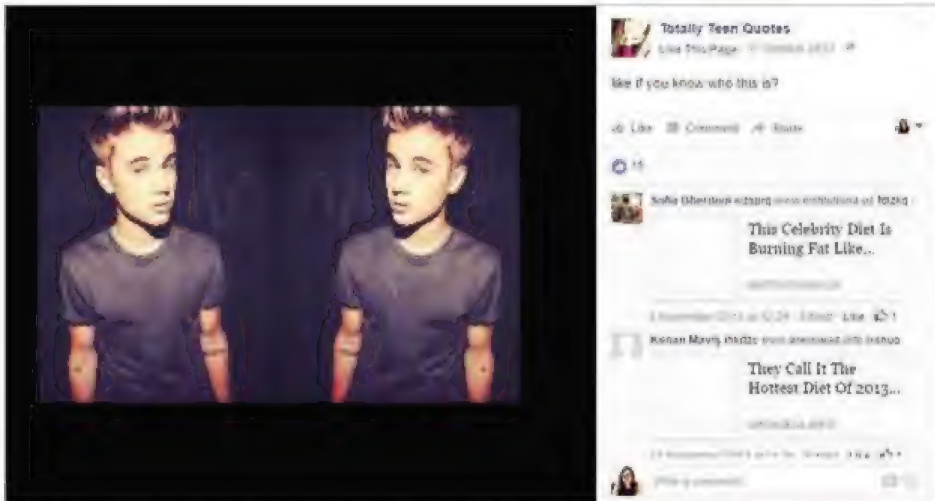
To some extent, all brands try to use that to their advantage. It's why they run competitions on their pages where you have to leave a comment to enter, or why they ask apparently throwaway questions to their followers; that kind of engagement means their future posts, like posts about sales or new products, will get more traction.

But Like farmers aren't trying to promote their page as it currently exists. They don't care if you like puppies; they're just scammers who are trying to drive up the page's popularity so they

**Name a 'FISH'
That does not
have the LETTER
'A' in it.**

I bet you can't ;)

**▲ Taunting, simple puzzles want you to engage.
Don't take the bait!**



▲ What's the point of Liking this kind of content? Save your Likes for things you actually like

“ When you're skimming Facebook over your morning coffee, you probably don't want to see pictures of dead animals ”

can then sell the page on to someone else, who'll change the info and start promoting whatever it is they really want to sell. By Liking a post or the page it came from, you're opening yourself up to more promotion from whoever happens to buy the page.

In the age of internet advertising, where everything you do online leads to increasingly targeted ads following you around the web, that might not sound all that terrifying. But it's not likely to be a legitimate retailer who buys the farmed page – most of those can collect Likes by themselves and won't want to risk getting involved in the shady world of selling Facebook Pages. It's totally against Facebook's rules to sell a page, and if they

get wind of it, the page will be removed. So the kind of business you'll find buying farmed pages will be the kind that wants to sell you cheap off-brand pharmaceutical drugs, cheap gold, cheap knock-offs of designer clothes... Or just steal your money and sell you nothing at all.

Not the kind of thing you want clogging up your feed, then.

Even More Sinister

Most of the posts you'll see from Like farmers are fairly harmless in and of

themselves. No one particularly minds seeing a picture of a kitten, for example, and being taunted by ridiculously easy trivia questions might be irritating, but it's pretty easy to ignore. Sometimes, though, in their never-ending quest for more engagement, the farmers will go one step further and start using images of sick or dying animals or children as part of their strategy.

Obviously, that's not particularly pleasant for you, because when you're skimming Facebook over your morning coffee, you probably don't want to see pictures of dead animals or be reminded of your own mortality. But it's particularly grim when you consider that those images have usually been stolen. So while the posts purport to be sympathetic, asking Facebook users to Like or comment as a gesture of goodwill or love towards the person or animal who's suffering, they're actually being remarkably cynical, banking on the empathy of others while they're really exploiting very real pain.

It's hard to imagine how much it must hurt and enrage someone to find that a picture of their child has been stolen to profit scammers. Journalist Courtney Westlake experienced it first-hand when a photo of her daughter was used by a Like farmer and ended up getting shared more than 23,000 times across Facebook. Her child, Brenna, suffers from a rare skin disorder, and the post in question asked people to comment 'Amen' as a prayer for her to be healed – all without her parents' knowledge or consent. Most of the people who shared



▲ Sometimes legit brands will use daft content like this to drive engagement, but there's still no real point to doing what they ask

Why 'Raising Awareness' Doesn't Work

Ever had a day where all the women in your Facebook feed seem to have gone collectively insane, posting inane status updates that just say 'Black' or 'On the kitchen counter'? Or where everyone suddenly seemed to be posting nonsense status updates, usually with a number attached?

Those are all part of a weird trend for Facebook chain posts. Usually, they pretend to be part of a charity appeal: the colours one, for example, is usually related to bra strap colour, and anyone who Likes the post will get a message from the poster telling them that they now have to get involved, by posting their own cryptic status and passing it on, supposedly to raise awareness of breast cancer. The other, similar games have their own elaborate rules and tenuous connections to charity appeals.

But as you'll have already worked out, they don't work. They don't do anything to raise awareness of any charity's work, and they also tend not to encourage anyone to actually donate. In the end, they're just more detritus clogging up the Facebook landscape, not doing anyone any good.

Facebook can be a great platform for raising awareness of good causes, though, and it can help charities to raise money – but just posting weird messages or hitting Like, won't do anything at all. It's all very well to click to offer 'support', but if you want to really support a cause, you'll need to open your wallet.

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➤ *The trend for using heart-wrenching images to steal Likes has become widespread enough to spawn parodies, like this dog with ham on his face*

it probably had the best intentions, but ultimately, they were just playing into the hands of a cybercriminal.

Just Don't Click

The whole thing is rather sordid and sad, but it's easy to fall for. It can be especially difficult to detect whether a post is legitimate or not, because these Like farmers are using the same techniques that genuine companies and people often use to grab a bit of the Facebook action for themselves. Some SEO blogs even recommend posting the very same sort of stupid questions ('name a fish without the letter A in its name!' etc.) that the scammers use, so it can be hard to know if you're dealing with someone with malicious intentions or just someone who's been given a bit of bad advice.

Then again, if a legitimate brand is posting mindless content like that, there's still no need to encourage them by clicking on it. The easiest way to avoid encouraging either scammers or crap social media managers is to only engage with Facebook posts that have some kind of worthwhile content. There's no need to prove that you can name a trout, or add up, or that you don't like cancer on your Facebook page – if you see one of these posts, you can just keep scrolling.

(Even comments pointing out that they're stupid or dodgy count as engagement, after all, so it's better to just ignore them. Or you could click to hide them, if you want to help Facebook's algorithms to filter this stuff out.)

And while Facebook's secret algorithms might seem annoying, because they mean you don't always get to see posts by people and brands you actually like, and that promoting your own stuff is harder, there is an upside: those very same algorithms are working to filter out as much of this junk as possible, and as they learn to identify this kind of content more reliably, it's likely that these scams will start to disappear completely.

Of course, then the scammers will just come up with a different way of trying to trick people into parting with their money. But we'll eventually all get wise to that too... [mm](#)



Other Facebook Scams To Watch Out For

You probably haven't seen a scam email land in your inbox for years, especially if you use Gmail, because most email programs are now well equipped to filter them out and direct them straight to your spam box. That's great. The problem is, scammers have just moved on to other platforms to try to part you from your money. Here are some scams known to be circulating on Facebook:

Clickbait headlines

You won't believe what happens next! Actually, maybe you will. While some clickbait headlines are from legit sources who just really want you to visit their websites, some of them are more sinister, leading to pages infected with malware. Sometimes they'll ask you to re-enter your Facebook username and password to see the content, or ask you to download software to play a video. If you do, you'll find yourself hacked or with a nasty virus on your computer.

Quizzes

What animal are you? An endangered one, if you fall for some of the sneaky quiz apps that float around Facebook. They might seem innocuous, but to take these personality quizzes, you'll have to give the app permission to access your Facebook account or otherwise enter your personal information, which could see you become a target for fraud down the line.

Extra features

Want to change the colour of your Facebook page? Or use a Dislike button? Well, you can't, but scammers are keen to offer you things like that in the hope that you'll install the bit of code they'll send you. It's a virus. Don't do it.

Free giveaways

Could you win a free iPad, holiday or tickets to a festival just by clicking through to another page? Almost certainly not. Again, this is a scam that attempts to play on Facebook users' desires, offering them something great if only they'll do something first... That might be filling in surveys (which ask for personal details), installing software (malware) or even sending a small sum of money to the scammer in order to claim a reward.

One particularly enterprising scammer recently claimed to be running a Total Wipeout Tour, which people could sign up to attend through Facebook – but it didn't exist and was just a data mining exercise.

There are a lot of different ways scammers will try to abuse your trust, including hacking your friends' profiles to send out their dodgy messages, and because it's Facebook, it's easy to fall for it. Be as sceptical about things on Facebook as you would via email or over the phone. If something sounds too good to be true, it probably is; if someone wants access to your info, it's almost certainly not for a good reason.

INDEPENDENT AND UNOFFICIAL GUIDE

MINECRAFT SECRETS & CHEATS



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Alphabet Pi: R

David Briddock meanders through Raspberry Pi technology from A to Z

THIS WEEK: Raspbian OS, RISC OS, Retro Games and Robotics

Raspbian OS

Raspbian is the official operating system of the Raspberry Pi. It exudes functionality with over 35,000 pre-compiled software packages, some performance optimised for the Raspberry Pi. This free Linux-based distribution is based on the community-developed image of the same name, which is in turn based on a stable edition of the popular Debian Linux.

The Raspberry Pi Foundation (raspberrypi.org) takes frequent snapshots of the community's work, then applies a few additional changes, to create its own officially supported Raspbian image. These changes include visual improvements, new and updated apps, additional development tools and subtle operational modifications.

Occasionally this snapshot coincides with a major release of the Debian image, where a great many changes are applied simultaneously. This last happened in October 2015 when the Foundation released Raspbian Jessie, based on a stable Debian Jessie image.

RISC OS

Late in 2012 the Cambridge-based Open RISC OS project team (riscosopen.org) announced the availability of its operating system for the Raspberry Pi. The origins of the RISC operating system go back to 1987 and the Acorn Archimedes computer, which was powered by one of the first 32-bit ARM chips. In fact install RISC OS and you can relive those BBC Micro days, as it comes complete with a an emulation of the BBC BASIC programming language. This means you can play some classic 1980s games such as *Guardian*, *Chuckie Egg* and *Dare Devil Dennis* if you fancy it (goo.gl/Y3HCg8).

RISC OS is free to download from the dedicated Raspberry Pi download page (goo.gl/kLV1U1).

Retro Games

Many Raspberry Pi owners enjoy playing retro-style games. With the PiPlay app (piplay.org) and you can emulate the SNES, NES, Gameboy, Atari 2600, Commodore 64 and many other games consoles. But this is just one of many game-focussed distribution images that transform your Pi into a gaming console.

Emulation Station (emulationstation.org) is another very emulator solution that's highly ranked by Pi users. In fact, it underpins the popular RetroPie project, which already supports a long list of retro-game platforms including the Amiga, Apple, Atari, Commodore, Sega, Nintendo and Sinclair consoles. Emulation Station's user interface is designed for lounge-based TV screens as well as monitors, which makes it ideal for use as the basis of a low-cost retro games machine.



▲ EduKit 3

“ The annual RobotWars event is a great place to be inspired by the potential of Pi robotics ”

Robotics

The Raspberry Pi computer is a perfect platform for hardware hacking and maker-style projects, and for many building a robot is one of the most interesting and educational challenges. Depending on your ambition and experience it can be anything from a simple rover to a highly complex design with stereo cameras, multiple sensors and autonomous behaviour. The annual RobotWars event is a great place to be inspired by the potential of Pi robotics (raspberrypi.org/blog/pi-wars-2). It occurs every December and has close ties with the equally popular CamJam event. Both take place in Cambridge, the home of the Raspberry Pi.

An inexpensive way to get started is via the EduKit 3, which costs just £17, plus £2 delivery, from the Pi Hut (thepihut.com/products/camjam-edukit-3-robotics). While the Raspberry Pi blog has seen quite a few robot-centric posts over the years (raspberrypi.org/blog/tag/robots). You could even create your own security guard (goo.gl/9cme1C). [mm](#)



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Component Watch

Can't afford a 4K monitor? Maybe you can compromise with one of these deals...

If you're looking to upgrade your monitor but think a 4K screen might be overkill, good news: there's a resolution just for you, and it's both cheaper and, in some cases, better-looking than a 4K screen – especially if you're close enough to see the pixels. Four times the resolution of a 720p screen, these 2560 x 1440 panels are technically known as WQHD (Wide Quad HD), and you'll get a picture almost as good as UHD resolution but with extra money to spread around on the rest of the monitor too. Can't say fairer than that.

Deal 1: Asus VX24AH

RRP: £281.99 / Deal Price: £199.49

This gaming monitor has dual HDMI and D-Sub inputs, a frameless design and built-in speakers for a high-quality gaming experience. There's also a VGA input and earphone jack, and a number of different settings including a special low-blue mode for night time use. Reduced in price by almost £100, it's a great all-in-one package for anyone who wants a larger, more precise screen.

Where to get it: Scan – bit.ly/294orW5



Deal 2: BenQ BL2420PT

RRP: £281.99 / Deal Price: £216.22

The BenQ BL2420PT is an IPS screen with 5ms response time and a special CAD/CAM mode aimed at designers and professionals. Inputs include a VGA port, HDMI port, DisplayPort and DVI-DL port. Built-in speakers and flicker-free design make it great for those who need a precision all-in-one work solution, while the fully adjustable base means you'll never have to end the day with a sore neck again.

Where to get it: Ballicom International – bit.ly/29smZOY



Deal 3: AOC Q2577PWQ

RRP: £264.99 / Deal Price: £218.70

This 25" screen has an inch on most of the others around this price, and that makes it an intriguing prospect – especially since it's not that expensive. Again, it has VGA, DVI, HDMI and DisplayPort inputs, and again there are built-in speakers. But

that extra inch is what makes it worth thinking about, even if it means a slightly lower pixel density. AOC might not be the most well-known name in monitors, but it's high quality enough to be worth paying this amount of money for, especially if you want a large high-res screen.

Where to get it: Scan – bit.ly/292fEUa



Deal 4: Asus PB258Q

RRP: £329.99 / Deal Price: £254.70

At the extreme high end of pricing, the Asus PB258Q has greater fidelity than other monitors, with a high-end panel, image accuracy enhancements and Asus SplendidPlus video intelligence technology to give you the most vivid and accurate colours possible. Again, there's a low blue light mode and a low power mode for energy saving. Ports include HDMI, D-Sub, DisplayPort and Dual-Link DVI-D, so you won't struggle to connect it. Best of all, it's wall-mountable: if you're in the mood for a serious display setup, the stand snaps right off.

Where to get it: Scan – bit.ly/29hrcGb



Deal 5: Dell U2515h

RRP: £274.80 / Deal Price: £255.37

Dell's monitors are always high quality, and this ultrawide IPS is a great high-end all-rounder. It has a 6ms response time, it's height-adjustable and wall-mountable, and it's got Dell's reliability and eco-efficiency enhancements that keep its performance strong. There's also a three-year limited hardware warranty and three-year advanced exchange service, so if anything does go wrong, there'll be a replacement with you shortly. In addition to dual HDMI, DisplayPort and mini-Displayport connections, it's got a five-port USB hub, one of which can be used for charging.

Where to get it: CCL – bit.ly/29soex2



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Electric Car Goes Really Really Fast

Apple Urged To Keep Headphone Socket

Hundreds of thousands of people sign petition

Is Apple really about to ditch the 3.5mm headphone socket on the newest iPhone? According to various online reports, that may just be the case – and if true, will presumably see Apple make further use of the Lightning connection, or instead focus on wireless headphones. Either way, the people of the world have been mightily vocal about their malcontent over this, with over 300,000 signing an online petition calling on Apple not to get rid of the headphone socket, please.

The petition was organised by site The Sum of Us, writing in protest “Not only will this force iPhone users to dole out additional cash to replace their hi-fi headphones, it will singlehandedly create mountains of electronic waste – that likely won't get recycled.” It doesn't stop there. “This is right out of the Apple corporate playbook. A few years ago it swapped out the original iPod-dock connector with a new one, making countless cords, cables and chargers obsolete.”

Ouch. Of course, this is all based on media speculation at the moment but if Apple is indeed looking at ditching the socket, it may want to have a rethink.



So you want to be a record breaker...

Students, eh? Nothing but work-shy layabouts. Or rather not, as some student engineers from Switzerland have proven – by building the world's fastest electric racing car.

The custom-built car, called The Grimsel, was put together by students from the ETH Zurich and Lucerne's University of Applied Sciences and Arts. It is so fast it reached 100kph in less than

two seconds (1.513 seconds to be precise) and this was a quarter of a second quicker than the previous fastest record time. However, in the interests of full disclosure of the facts, it should be noted that the grimsel reached the record speed over just 30m of track.

It's fast, for sure, but could we fit the kids, suitcases and hamper in it for a weekend trip? No. Probably not.



If you type 'www.piratebay.org' into a web browser (and I'm not suggesting you actually should), you'll be greeted with a message from your ISP, telling you that this famous piracy site has been blocked, in accordance with a court order.

In fact, this is just one of many sites that have been blocked in this way, and the list of sites that are getting this treatment is growing all the time. Of course, piracy still exists, and there are plenty of proxies of sites that offer illegal content. Sometimes these get blocked too, but not always.

But this isn't the only way content providers are protecting their material, though. Quite a few torrent sites have been shut down completely at the source and the owners either arrested or cautioned.

Is it enough, though? That's a more difficult question to answer. As far as I can tell, the authorities and the rights holders are getting ever more adept at blocking or shutting down piracy sites, but it's a case of whack-a-mole.

The solution, as I've always said, is to provide affordable, high-quality legal alternatives. Piracy will always exist, of course, but who cares if the money is still rolling in?

Anthony

Oculus Dumps DRM

Games developers, dive in

The good chaps over at Oculus VR have gone back on their previous decision to use hardware-based DRM for the Oculus Rift headgear.

Prior to a recent change of heart, Oculus implemented a DRM check on the headset relating to software sold through its Oculus Store – that basically blocked third-party software, called Revive, from then porting those games to be played via the HTC Vive – clearly an Oculus rival. Now, Oculus VR appears to have implemented an update to the headset that has changed things, effectively taking out the DRM.

Given that before this update Oculus was trying to stop Revive from going about

its business, this change has been a bit of a surprise. We like a world without DRM,

though, so a big “well done” to Oculus VR for doing the right thing.



Meanwhile... On The Internet...

The 'echo chamber' effect (tinyurl.com/MMnet21a) is a much discussed phenomenon, especially in the age of social media (tinyurl.com/MMnet21b) – though the original concept pre-dates it by quite some time (tinyurl.com/MMnet21c). Put simply, the idea underpinning the concept is that beliefs are reinforced by the repetition of stories from the same or similar sources. In a social media context, it's a twist on 'confirmation bias' (tinyurl.com/MMnet21d) – where you interpret information in a way that supports your own views and expectations – that describes how people gravitate towards other people with the same beliefs and background as themselves online, and thus have their beliefs reinforced by followers and friends.

In the political pressure cooker of the last few weeks, most social media users will have noticed a significant rise in the volume of their echo chamber (tinyurl.com/MMnet21e), as various ideologies express disdain at others. Of course, what's made the current political manoeuvring seem so raw on the nerves is that the 52-48% split over the Brexit has divided families (tinyurl.com/MMnet21f) and the wider Union of the UK. That's a fact that – ironically – may have lead even more people to back to the relative safety of their online echoes, rather than into another fraught debate with family and friends.

It bears noting, though, that social media – and specifically the rise of the so-called 'Newsfeed', implemented by Facebook, but adopted by Twitter recently too (tinyurl.com/MMnet21g) – does not, in the same way as the wider media generally aspires to do (while not usually succeeding), seek to draw in voices from different backgrounds and political leanings. It is a curated space designed to deliver things the social network believes you want to read (interspersed with promoted posts and marketing messages, of course), it is designed to keep you reading, to make you want to use the social network more. However, in a world where people increasingly depend on social media for their news (tinyurl.com/MMnet21h), the Newsfeed has a massive potential to shape people's views.

That means that changes to how Facebook formulates its Newsfeed, such as the ones that were announced last week (tinyurl.com/MMnet21i) to ensure that "the things posted by the friends you care about are higher up in your News Feed" friends and family, are bound to cause concern in some quarters (tinyurl.com/MMnet21j) – in much the same way as concerns over changes in Google's search algorithm (tinyurl.com/MMnet21k), or accusations

that it is censoring autocomplete searches (tinyurl.com/MMnet21l). Chief among those that could be effected by such changes are the media outlets that increasingly rely on Facebook for clicks to their articles, with it being responsible for almost 40% of referrals (tinyurl.com/MMnet21m).

So, while Facebook's attempts to downgrade the importance of News in its Newsfeed could be another problem for the media to overcome in the digital age, it could also significantly diminish the amount of debate and analysis people see online even more. Actually, that doesn't sound to bad right now (tinyurl.com/MMnet21n)...

If the reality of the world is not doing your head in already, then maybe the work of Kokichi Sugihar will finish it off (tinyurl.com/MMnet21o). His mind bending 'ambiguous cylinders' (a set of shapes that appear different to the viewer when seen in a mirror, somewhat explained by this example: tinyurl.com/MMnet21p) were created as part of a Best Illusion 2016 contest (illusionoftheyear.com), though the fact he only came in second would appear to leave him as front-runner in any Daylight Robbery of The Year competition that may come along in its wake.

Although, the winner – this excellent little video showing of visual tricks that fool the eye into tracking movement incorrectly (tinyurl.com/MMnet21q) – doesn't quite mess with the head in the same way Sugihar's shapes.

When you love wasting time at work as much as we do (sorry boss), you quickly become au fait with the internet archive's impressive repository of old video games (tinyurl.com/MMnet21r) that you can play in your browser wherever you happen to be skiving. While that may be great for casual players like us, apparently in-browser emulation simply isn't good enough for some people (tinyurl.com/MMnet21s).

That's why Ryan Holtz, aka MooglyGuy (@TheMogMiner) of the team behind the MAME (Multiple Arcade Machine Emulator: mamedev.org) project, has sought to add another layer of retro dust to the already impressive range of emulations it offers by creating effects that mimic the performance of CRT monitors in-browser (tinyurl.com/MMnet21t). It's only available for one game at the moment, but we can see it being used a lot more as time takes its toll on the vintage equipment that these games were originally played on (tinyurl.com/MMnet21u).

.AVWhy?

There's been a lot going on in the last week, so you may have missed the news of the passing of Gordon Murray. You may not recall the name, but we can virtually guarantee that - if you are of a certain age - you will know his work. He was, you see, the man behind a classic trinity of BBC animation shows – *Camberwick Green*, *Trumpton* and *Chigley* (tinyurl.com/MMnet21v) – and is therefore the man responsible for bringing Windy Miller *et al* into so many lives. Perhaps the most remembered moment from any of his animations, though, is the firestation sequence from *Trumpton*, with it's wonderful Freddie Phillips-composed refrain... (tinyurl.com/MMnet21w)



Caption Competition



"Yay! It's running Windows Hen!"

Issue 1419 offered up this image for your captioning pleasure, here's what you sent us...

- **Thomas Turnbull:** "We are watching a horror film called *KFC The Movie*."
- **Thomas Turnbull:** "Get in line everybody there's a pecking order."
- **blacklion1725:** "Cluck here to launch Microsoft EggShell."
- **Jason:** "Ayup, me ducks – this Mavis Beacon software is the biz. We'll be touch-typing in no time – no more hunt-and-peck for us! "
- **doctoryorkie:** "The only thing missing from KFC is U."
- **doctoryorkie:** "This is what you get when you order a five bird roast online."
- **EdP:** "Windows 8 chickens coming home to roost."
- **wyliecoyoteuk:** "The last Windows 10 holdouts were quite literally chicken."
- **ricedg:** "Testing the new laynovo."
- **Darren LeWarne:** "Fixing a laptop is no poultry matter."
- **Dennis Bright:** "This PC isn't just bad; it's fowl."
- **Greg Carver:** "Yay! It's running Windows Hen!"
- **Terry Anderson:** "Someone said this Photoshop has a feathering tool."

Some great stuff there, but our winner this week has to be Greg Carver with the puntastic "Yay! It's running Windows Hen!"

If you have a caption for the picture below, head to the 'Other Stuff' section of our forum (forum.micromart.co.uk), or email us your funnies via editorial@micromart.co.uk, remembering to add the issue number to the email subject line.



Privacy Shield Arrangement Agreed

EU members to have their say

A data-sharing agreement between the US and the EU could be brought into being in July as a finalised arrangement has been put forward to EU members. Under the new arrangement, the US has agreed that collection of data from the EU can only take place if conditions are agreed upon before any data transfer

actually takes place. That data collection also has to be "targeted and focused" so that big chunks of citizens' data are not stored across the pond.

Of course, with the UK now working to separate itself from the EU, this may not effect us for long, and we'll have to come up with our own legislation regarding data sharing with the US. Complicated stuff.

Tech Firms Suffer Over Brexit Vote

Uncertain future worries companies

When the Leave vote came in companies naturally gave their reactions – and for the technology world, worry and uncertainty were the words of the hour. Share price falls for the likes of BT and Sage were reported following news of Brexit becoming a reality as worries over the implications of the decision to leave the EU came to the fore.

These share falls were backed by comments from the

Chartered Institute for IT, which stated that the Brexit decision will have a significant impact on both the UK's IT industry and people's access to digital skills.

The Institute's chief executive said following the vote result that the government needs to address a bunch of areas if it's going to bypass the negative impact of leaving the EU. The Institute also said that any loss of EU funding to universities needs to be replaced from other sources. Urg.

Snippets!

Slack Teachers Fired

Three teachers have been fired from a school in America's Rhode Island after messages badmouthing students were leaked online. Screenshots of the private messages, that were posted on group messaging service Slack, were uploaded online and the general tone and content was reportedly extremely disparaging to several students within the school.

YouTube Goes Live

YouTube has announced that it's going to roll out live mobile broadcasting directly into its mobile app after having initially made it available to a few popular users. An associated blog post on the matter wrote that live videos will be easy to capture via a "big red capture button" in the corner and users will also be able to take or select a photo to use as a thumbnail, and broadcast live to fans and also chat in "near real time".

The wider rollout is billed as coming "soon" so keep an eye out for this one.

Bots Botch EU Petition

The extremely popular online petition that is calling for a second EU referendum has reportedly attracted the attention of automated bots that have falsely added signatures, meaning that actually it might not be as popular as it first seemed.

With accusations that nefarious people are scripting programs to automatically sign the petition, the House of Commons was forced to get involved and removed tens of thousands of signatures while it looked into the matter further.

For the people who have added their signatures in good faith, this is all a bit rubbish. Of course, the petition won't matter anyway as Mr. Cameron has said that there will not be a second vote.

Apple Stops Making Thunderbolt Screens

No more after current stock

Five years after its debut, Apple's Thunderbolt display will cease to be after the company announced that it wouldn't make them once the current stock runs out in Apple stores and online. This is a little annoying for anyone who bought into Apple's rhetoric about the power of Thunderbolt over other connection ports and we don't know whether it intends to unveil another monitor in future. For now, this could mean no more monitors from the firm, though.

In other Apple news, sales of its Apple Watch have helped drive global revenues for wearable devices, revenues that have risen by 133% in the first quarter of the year to \$6bn. The stats come

from Futuresource Consulting, which also notes that Apple is one of the largest watchmakers in the world, which rather puts a different take on just how successful the Apple Watch has been.



Microsoft Loses Update Case

\$10,000 payout in US

Now here is a true case of the little guy winning the day... Teri Goldstein took Microsoft to a small claims court over a complaint that a Windows automatic update had left her computer unusable. The Windows 10 update took place on her Windows 7 computer, with Goldstein's argument being that this took place without her prior permission. As the update meant that she could no longer use her business computer as before, she decided to take Microsoft to court and duly won the day, pocketing \$10,000 in the process to cover lost wages and pay for a new system.

For its part, Microsoft agreed to pay up to save on legal costs, but this is an interesting case to win as Microsoft's rollout of Windows 10 has

been widespread and far from welcome for many consumers who were perfectly happy with how things were. Goldstein has been quoted in the press as saying "I had never heard of Windows 10. Nobody ever asked me if I wanted to update" and that the update had rendered her previously decent system a much slower beast.

Naturally she's now also encouraging others who might be unhappy with Microsoft to take similar action, something the company will be hoping is not the case.



Post Longer Clips To Twitter And Vine



Length extended as services focus more on video

The core idea behind both Twitter and Vine is that users can post short, timely messages and video clips that get right to the point in no time at all. Odd, then, that both services have now significantly moved the goalposts by upping the length of videos that can be uploaded to 140 seconds.

Vine previously had a six-second limit and Twitter's limit was 30 seconds so this is a big change for both services

and does rather move both away from the very things that made them different to the likes of Facebook and YouTube. The problem is, however, that Twitter is behind both of those when in video terms so this is obviously an attempt to deal with that.

Users can upload longer videos right now from mobile apps and Twitter.com while an update is also coming for Twitter for Mac and Twitter for Windows.

Burglar Boasts About Job On Facebook

Three guesses as to what happened next

We've all done it. Facebook is a veritable hotbed of boasting about this and that, from gaming achievements to new purchases, to anniversaries and engagements. Yes, you'll often read all sorts of proud boasts on the social networking site.

It's not often that you'll read a burglar bragging about his achievements, yet 18-year-old Raderius Glenn Collins was arrested after uploading video

footage of him showing off over a \$500,000 jewelry job that also included an accomplice waving banknotes aplenty in front of the camera. After the upload, Florida police did the only sensible thing and arrested the chap. The video in question attracted thousands of views and reportedly shows the man and his friends eagerly talking about their ill-gotten gains.

A spokesperson for the local government told Reuters: "It was just one dumb decision after another."

Gym Vs Internet?

It's the Internet, isn't it?

The gym is great. At the gym you can run for miles, cycle for more miles and then finish off with a bit of rowing. For miles. The Internet is great. On the Internet you can research anything you like, play online games and watch some wonderful television. For hours.

But which is better? Quite obviously, it's the Internet. You knew that already, but now we have some research to back it up. Thinkbroadband.com, the leading independent broadband news and information site, polled 1,125 British consumers and it has found that 46% of people would sacrifice their gym membership if they had to cut back on one household bill. By contrast, just 5% said that they would cut back on broadband.

The only option that respondents would be less willing to sacrifice over broadband was their mobile phone spend, as just 4% of consumers said that they would choose to go without their mobile device. So, sorry gym. We'd much rather spend our time in a digital world.

Er, hang on...



Nvidia GTX 1080 Founders Edition

The world's most powerful graphics card

DETAILS

- Price: £619 (via Overclockers UK)
- Manufacturer: Inno3D
- Website: goo.gl/A2zbNn
- Requirements: PCIe 3.0 for best results, minimum 500W PSU, 4K monitor for best results



▲ The GTX 1080 is a thoroughly impressive graphics card, but expensive for the Founders Edition

The GTX 1080 is Nvidia's new flagship graphics card, and the most powerful GPU available to us mere mortals.

It's little wonder Nvidia has made such a fuss over the new GPU. Designing the Pascal architecture took some time and cost the company a fair amount: the word billions is bandied about lots when it comes to the total cost of the design.

It should be pretty good, then, and it is. In fact, it's an extraordinarily powerful GPU and one that will help launch the PC into the new era of VR and 4K gaming with the hope of leaving the current generation of consoles standing and looking quite meek in comparison.

The move from the previous architecture, Maxwell, to Pascal is something worth looking into. On paper, it's certainly sounds interesting, from the point of view of the enthusiast at least. The smaller manufacturing process of 16nm, compared to the previous 28nm, offers a greater number of transistors, which in turn boosts performance significantly, while dropping the need for power and ultimately heat.

Of the many versions of GTX 1080 currently available, we

have the Inno3D Founder's Edition available. In this case, the GP1-04 GPU at the heart of the GTX 1080 manages a clock speed of 1607MHz, with a boost to 1733MHz. There's 8GB of GDDR5X memory running at 1251MHz, and a whopping 2560 CUDA cores. Connectivity consists of DVI, HDMI and three DisplayPorts on this version.

The Founders Edition cards are, in reality, a rename of the reference cards that Nvidia usually launches with a new GPU. They run the official clock speeds of both the GPU and memory, so where's the benefit in buying a Founders over a manufacturer's edition? In essence it's down to the quality of the components used, with

the Founders cards exceeding the expected degree of quality control. It's up to you, though, if you think that warrants the extra cost.

Another interesting element to the new Pascal architecture is the support for Nvidia Ansel. Ansel is a technology that allows you to take a 3D, 360° panorama image while in-game, and while this may not appeal to a lot of users, there's a substantial section of the gaming community that sees in-game photography as a form of art. Either way, it's an intriguing addition to the new generation of graphics cards.

In terms of performance, the Inno3D GTX 1080 performed magnificently. The 3DMark 11

test produced a score of 1,7013, using the Overclockers Titan ForceBox VR10 Gaming System as the benchmark base. Further tests using the VR10 revealed the likes of *Doom*, running in Ultra settings at 2560 x 1440, having an average 119fps – dropping to the lowest point of 97fps during particularly intense scenes.

VR, too, using an HTC Vive, was exceptional. The GTX 1080 didn't even break into a sweat when we put the card through its paces with a selection from the Steam Store. And as you would expect, 4K viewing was equally satisfactory, with *Doom* again rarely dropping below 60fps.

The Founders Edition cards are more expensive at present. This example comes in at £619.99 from Overclockers UK. You can, however, see the price drop to around £569 for the GTX 1080, using the MSI version of the card again from Overclockers.

Regardless of which model you opt for, the Nvidia GTX 1080 is an incredible graphics card that's head and shoulders above the competition.

mm David Hayward

Expensive, but an incredible graphics card



Synology DS416Play

A consumer NAS with business-like specifications

DETAILS

- Price: £372
- Manufacturer: Synology
- Website: goo.gl/g2iKcB
- Requirements: Gigabit network for best results, four 3.5"/2.5" SATA-2/3 HDD/SSDs

Synology has just about perfected the NAS solution for small businesses and 'prosumers'. The company's DiskStation 415+ range were some of the best NAS units around for pro users and business workgroups. The company hasn't been slow on the consumer side of things either, with the recent release of the DS416Play.

This is a four-bay NAS drive complete with an Intel Atom Celeron N3060 dual-core processor running at 1.6GHz (with a Turbo boost of 2.48GHz), with 1GB DDR3 memory and a built-in 4K hardware video transcoding system with support for H.264, H.265, MPEG-2 and VC-1. There's even a business spec AES-NI hardware encryption engine available.

Other features include three USB 3.0 ports (two on the rear and one located at the front), and dual gigabit Ethernet ports. The two large 92mm fans located at the back of the unit do an excellent job of keeping the four drive bays cool, even when under substantial load.

Naturally, this increases the noise of the device somewhat, along with the drives chugging away in the hot-swap frames, but the design of the DS416Play does dampen the noise levels slightly. The on-paper level

indicates 19.4 dBA, but we're tempted to say that even with four 1TB drives fitted and whirring away, the noise levels were below that and barely audible at all.

The DS416Play is actually quite a stylish-looking unit considering its size. The matte-black finish of the body is complemented by the piano-black door, which is easily removed thanks to four rubberised plugs that squeeze into the two end drive bay slots.

Behind the hardware, though, is the real star of the

show, the DiskStation Manager operating system. Now on version 6.0, this Linux-based OS boasts a much improved security enhancement by utilising AppArmor to block any unauthorised access to the system resources through malicious programs.

DSM 6.0 also offers improved backup apps, which include off-site and cloud storage, as well as several anti-virus packages, a surveillance command station, iTunes server, an eCommerce solution, email server, podcast

generator and a WordPress platform tool.

Needless to say, there are countless more apps and packages for home users and small businesses. They're executed well, partly thanks to Synology making sure that the DSM packages are developed correctly, as well as the adequate hardware that's driving the unit. Get a few packages up and running, and the DS416Play can still stream and transcode high- and ultra-definition video without any visible signs of the processor struggling under the load.

There's a lot going on with the Synology DS416Play. The fact that you could potentially have 32TB of storage with four 8TB drives, plus there are multiple RAID levels to choose from and the potential to add external drives via the USB 3.0 ports. However, we do think Synology could be missing a trick here by not including an HDMI or eSATA port.

Considering the specification of the DS416Play, Synology has managed to keep it reasonably cheap. £372 isn't too bad at all, although you'll need to factor in four drives as well. Still, it's an excellent power-NAS for the home.

mm David Hayward

A great NAS, with plenty to offer



▲ The Synology DS416Play is a capable four-bay NAS



▲ Connectivity is good, but perhaps eSATA and HDMI would be a nice addition?

Acer Predator 8 Gaming Tablet

Can Android gamers be lured by Acer's Predator 8?

DETAILS

- Price: £199.99
- Manufacturer: Acer
- Website: goo.gl/3hqouP
- Requirements: Wi-fi broadband connection



Since Asus stopped making the excellent Nexus 7 gen 2, I've been looking for an obvious replacement for that hardware. Many people want an Android tablet that has sufficient power and storage to do all the mundane stuff and also be handy for playing games.

The Predator 8 attempts to fill that void with a stylish looking 8" platform, interestingly built around Intel's quad-core Atom x7-Z8700 1.6GHz and not an ARM processor.

The first thing that stuck me about the Predator 8 was the vibrant screen, because the 1080p 8" IPS panel Acer used absolutely zings. Games look very colourful, celebrities even more orange, and your eyes are relentlessly assaulted by it. And with four speakers and Dolby virtual surround, your ears take

a bashing too, even if there isn't much bass to speak of.

In terms of the rest of the specification, the processor looks powerful, 2GB of RAM is decent, and the 32GB of eMMC storage is more than enough to be going along with.

Should you burn through the 20GB of free space, there's also a micro-SD card slot that can expand storage by another 128GB. The cost of a 128GB micro-SD is about £35, if you want to include that in your budget.

Neither front nor rear camera is going to excite anyone, so I won't embarrass Acer by talking about them. If you want to take pictures, get a camera or phone with a good one on it, and not this.

any rush to bring Marshmallow to this hardware, it seems, even if it would probably be enhanced by that upgrade.

Battery life is quoted at 7.5 hours, but that assumes you're not using the Predator 8 for

“ As user experiences go, the Predator 8 is generally responsive ”

Acer Predator 8 Specifications

Operating System: Android 5.1.

CPU: Intel Atom x7-Z8700 1.6GHz.

RAM: 2 GB.

Screen Type: 8 inches IPS LCD.

Screen Resolution: 1920 x 1200 pixels (283 ppi).

Storage Capacity: 32 GB.

Additional Storage: Micro-SD up to 128GB.

Camera Resolutions: 5MP rear, 2MP front.

Battery: Non-removable Li-Po 4420 mAh battery.

Bluetooth: v4.0, A2DP, LE.

Ports: Micro-USB.

Dimensions: 217.9 x 127 x 8.6mm.

Weight: 353.8g.

Since there isn't a SIM card slot, the Predator 8 can connect using either Bluetooth or wi-fi, although the latter is only up to 802.11n spec and not 802.11ac.

More gamer-friendly features include two vibrating pads on the rear that Acer calls 'TacSense', which are meant to give you more feedback. These didn't impress this reviewer much, and they also made me wonder how much power they require to buzz your hands.

The version of Android on offer is Lollipop 5.1. Acer isn't in

gaming, its actual purpose. If you can manage a third of that playing *Asphalt 8*, then you've done well, even in power saving mode.

As user experiences go, the Predator 8 is generally responsive, and for the majority of games, there is more than enough power in this tablet. However, the more I stressed it out with various benchmarks, the greater the impression I got that Acer's choice to go Intel here was a hefty mistake.



Using Futuremark's Slingshot Benchmark test, the Predator 8 scores 1,258, a level that puts it just ahead of the Nexus 6 phone and less than 50% of what the Nvidia Shield can deliver.

Even more concerning, it only just beat my Nexus 5X, a phone that currently costs about the same but has all the advantages of greater portability and 4G connection.

If the performance was a mild disappointment, the aspect that really undid Acer's good work was its lack of self-control in respect of the Android installation. In the very worst tradition of its PC distributions, some marketing fool plastered all manner of junk application links all over the default installation.

Most of the junk is just links thankfully, though some are installed, and most can be removed. What concerns me is that should the tablet be reset or OS upgraded, then all this bloatware will probably reappear.

This is a real shame, because without all this junk, the Predator 8 is a solid if slightly unspectacular performer that could have attracted many Nexus 7 customers looking for their next device.

When this device first launched, it was £250, and

it can now be found for about £200. But it is in direct competition with the Nvidia Shield K1, where the 16GB model costs around £150. For the price of the Predator 8, you can get the K1 and a wireless controller or a 128GB micro-SD card.

For general Android use and occasional gaming, the Predator 8 is great, but those who take their Android play seriously are going to pass this up for more focused products like the Shield K1.

That leaves the Predator 8 as much better than a cheap tablet for most tablet tasks, but hardly the first choice for its chosen niche.

mm Mark Pickavance

An Android gaming tablet that doesn't quite deliver



Tt eSPORTS Challenger Prime RGB Gaming Mouse And Keyboard

Thermaltake launches a colourful keyboard and mouse combo

DETAILS

- Price: £48 (Scan)
- Manufacturer: Thermaltake
- Website: www.ttesports.com
- Requirements: Two free USB 2.0 ports

Not everyone can afford the latest mechanical gaming keyboards from SteelSeries or Corsair. And even if you can, it just might not be worth it for the occasional gamer.

Thermaltake made its reputation with cases and coolers, but it's now moved into affordable gaming gear, with this attractive keyboard and mouse combo for less than £50.

As Thermaltake goes, visually the Challenger Prime RGB combo is quite restrained, and only the internal illumination really marks this out as a gaming focused product.

The keyboard layout is a pretty standard layout until you get to the macro and media keys, and the mouse isn't anything that would seem excessively out of place in an office environment.



By disabling the illumination, they both take on an air of general functionality that gives them a wider appeal. But they're really for gamers who want some bling on their systems.

Realistically at this price you don't get per key illumination on the keyboard or even all the keys lit. But you do get a choice of seven pleasant colours and a dial to control exactly how bright the LEDs can be.

This didn't seem to warrant 'RGB' lighting, but I later discovered that you can make



the backlight any colour you fancy through the PC.

To achieve this and unlock some of the profile options, you need to visit the TT eSports website and download a utility that allows you some proper controls. I didn't find this easy to locate, and Thermaltake needs to work on making it easier to find and install.

For those who are rather exact about their playing

controls, you need to know that the wrist rest on this design isn't detachable, though I didn't find it obstructive in any way.

There are some extendable feet at the rear to allow for more rake. As much as I liked this alternative angle, the keyboard does flex more when supported in this way.

If I have a problem with the keyboard design, it's the membrane, because having

Features

- Multi-colour RGB backlighting with four different lighting effects.
- Six levels of backlight brightness and three lighting effects speed.
- N-key rollover
- Record on-the-fly macros with the macro keys.
- Ergonomic mouse design with on-the-fly DPI control.



used mechanical keyboards for so long, I've become used to their very positive key action.

For me, a degree of retraining was required. To avoid joint damage, I don't generally go through to the end of a keystroke, but on the Challenger Prime that's a necessity to register a press.

Where this is most noticeable is on the spacebar. If it isn't struck in the absolute centre, it can decline to register as

struck. But then, this is me trying to type on a keyboard that was made for gaming.

Where this design embraces its intentions is in respect of the macro key functionality, where entirely on-the-fly you can record key combinations and tie them to the six macro keys. Actually, I think from the keyboard it's technically possible to re-map the entire keyboard, although without any feedback about



what you're doing, that could be a complete nightmare. Interestingly, the macro definition available in the software doesn't go as far as what you can do directly on the keyboard.

Anti-ghosting covers 24 keys – more than enough for most purposes.

The mouse is very similar to many popular pear drop designs we've seen in the past few years. On the plus side, it uses a decent PIXART sensor and Omicron switches, and you can set four levels of DPI from 400 to 3200. Sadly, you can't adjust those DPI spacings, and there isn't any option for 1000Hz polling as per the keyboard.

Unlike the keyboard, you can't customise the colour exactly, because it's used to tell what DPI you've chosen. You can make it spectrum cycle or turn it off, though how to do this isn't covered in the documentation, and I discovered the information elsewhere.

With the exception of a somewhat notchy scroll wheel, the mouse is very serviceable, even if it doesn't quite match the lighting capabilities of the keyboard.

Thermaltake didn't consider the mouse at all when it

designed the software utility which is exclusively for the keyboard. Therefore, you can't tie its lighting to the keyboard or direct any of the macros to the buttons, unfortunately.

The Challenger Prime RGB isn't a high-end product, but it does what most gaming combos need to do, critically.

I would have liked better documentation, better software and maybe a USB port on the keyboard, but even without these things, it isn't unusable by any stretch.

You can buy the keyboard separately for about £30, should you fancy one of those and not the mouse.

mm Mark Pickavance

An affordable LED lit membrane gaming keyboard and mouse



BenQ BL2405HT

Does this business-class display have anything to offer home users?

DETAILS

- Price: £129.99
- Manufacturer: BenQ
- Website: goo.gl/kX4Y8p
- Requirements: DVI, HDMI, VGA output

It's always interesting how technology from the business world is adopted into the consumer and gaming world, and vice versa. Monitors, for example, tend to take elements from one to the other, such as ergonomics from the business section or faster response times and high refresh rates from the consumer markets.

BenQ has a tendency to integrate monitor technology from one sector to the other, improving and altering, while offering a slight edge over the competition. The BL2405HT, for instance, is a business monitor that features all the usual industry expectations, but it also adds a few extra consumer-focused features to up the ante.

This is a 24" TN panel, with a maximum resolution of 1920 x 1080, a 1000:1 typical contrast ratio, a dynamic contrast ratio of 12,000,000:1, a 2ms response time, and with 170° viewing angles on the horizontal and 160° on the vertical.

Connectivity is standard for a business model monitor, with HDMI, DVI and VGA. There's also a headphone and microphone port, but nothing else. That's not so much a big deal in this instance, since most business-led PCs don't worry too much about DisplayPort or multiple HDMI ports.

Ergonomics are of more importance for a business monitor, since health and safety like to point out any omissions

during their regular office checks. In this case, they'll walk away happy, because the BL2405HT has a -5° to 15° tilt, 45° left and right swivel and a 90° pivot, and it's height adjustable to 110mm.

From the consumer world, BenQ has adopted flicker-free technology; low blue light; BenQ's Senseye technology, which automatically adjusts the brightness levels and performs colour mapping and improves image sharpness; and a pre-selection of different monitor modes to help improve the output.

The design of the BL2405HT isn't much altered from the rest of the BenQ business line. It has a good build throughout and moves through the various ergonomic motions fluidly and

without any creaks or audible signs of stress on the plastic. The base is suitably stable, and the rotating section at the bottom – where the rubber feet are – moves freely when the weight of the monitor is added.

The screen output too is good enough for long hours in front of the monitor. We could happily use it for work, and thanks to the improved Senseye technology and decent response rate, it's also pretty good for gaming and videos. While it's not as crystal clear as other IPS displays we've seen, it certainly more than adequate for the vast majority of users.

In terms of the cost, the BenQ BL2405HT can be had for around £129.99, which is pretty good for an ergonomic monitor with some

added consumer-based technology. It certainly won't break the bank, and overall it's a good monitor to consider.

mm David Hayward

Well-priced, with some great screen technology included



▲ The BenQ BL2405HT combines the best business technology with some consumer extras



VQ Christie DAB+ Radio

VQ evokes design from the 50s with a stylish DAB+ Radio

DETAILS

- Price: £129.99
- Manufacturer: VQ (formally View Quest)
- Website: goo.gl/DsvjW3

Long-time readers of Micro Mart will be aware that I'm not a fan of DAB radio, since it doesn't appear to offer substantial benefits over FM radio, to my mind.

However, they still keep making the hardware, and we've now subtly shifted from DAB to DAB+ technology, if anyone is still interested.

VQ makes a range of DAB products, and the Christie continues its signature styling of placing the latest tech inside a decidedly retro package.

Looking not entirely unlike a 1950s fridge, the 21.5cm high Christie features a single 10W NXT neodymium driver in a wooden case that's wrapped in leatherette. The review model was cream and a pale blue two-tone, but you can get this in a range of colours beloved when the Queen first came to the throne.

Technically, there are a range of ways to get sound out of the Christie, which don't involve DAB or DAB+ or even the FM

that View Quest also included. On the rear is a 3.5mm jack in and out, and the system can be easily paired using Bluetooth to a phone, tablet or PC. To this end, there's even an NFC hotspot on top, but for whatever reason, the makers used a horrible sticker on the leatherette to show the location rather than an embossed mark.

All the controls are via a circular control panel that includes a 2.4" LCD panel, so you can see the time and what station you've chosen. The party trick of this interface is that it

can be rotated anti-clockwise through 90 degrees, allowing you to use the Christie on its side or upright.

My initial reaction to this feature set is that this is a DAB radio I might actually use, given the flexibility of the solution. However, there is one aspect of this design that rather undermines it – specifically, how it's powered.

Out of the box, the Christie comes with a small three-pin PSU that powers the unit and also provides sufficient juice for a USB port on the rear that you can use to charge phones or tablets.

The only problem with this is that it restricts where you might use the radio, because bathrooms and some parts of the kitchen don't normally encourage electrical appliances.

Normally, the solution would be battery power, and that's an option if you're willing to pay an extra £19.99 for the proprietary



battery or £29.99 for the battery and carry case kit.

That you can't use ordinary cells is disappointing, but on the upside, the battery is charged in place and promises 16 hours of playback.

That's another snag with DAB, because an FM radio would last much longer with the same power resources and wouldn't drain power in standby mode.

Despite these issues, this is a gorgeous piece of gear that delivers plenty of good-quality sound while looking marvellously retro.

mm Mark Pickavance

Large but elegant DAB+ radio with many useful features

Features

- DAB (and DAB+) reception: (band III 5A-13F).
- FM reception: (87.5MHz-108MHz).
- 30 preset channels.
- Bluetooth pairing with NFC connect.
- 3.5mm aux-in and headphone out.
- USB charging port.
- Size (WHD): 215mm x 135mm x 126mm.
- Weight: 1.2kg.



BUYER'S GUIDE

Keyboards

Despite the modern wonder of pawing at a screen as an input device or being spoilt by modern operating systems that require more mouse work than anything else, the keyboard still reigns as the king of the peripherals.

A good keyboard can have highly positive effects on the user, including better hand positions, more features to use and a great level of overall responsiveness.

This week, we're looking at six top-of-the-range keyboards to see what kind of thing is available.

Keyboards

Cherry G80-3000

DETAILS

- Price: £55
- Manufacturer: Cherry
- Website: goo.gl/EshkQ0
- Requirements: USB or PS/2 port, PC or Mac compatible

It's nigh impossible to have a keyboard guide without at least one mention from the German company Cherry. The company's switch technology is used worldwide and has become the yardstick by which to measure other mechanical switch technologies.

The Cherry G80-3000 is a design classic, a model that has seen service for over 25 years. It's simple, accurate, reliable and has managed to squeeze in some modern elements despite its advancing age.

The G80-3000 comes in two colour models, one being black – which we have for review – and the other being a more classic beige (or Light Grey as Cherry calls it). The nostalgic users among you will undoubtedly recall the beige version with some fondness, but there's no difference between the two models other than the colour.

It's a 105-key keyboard measuring 470 x 195 x 44mm, which makes it quite deep, and it weighs 935g. The layout hasn't changed much in the last quarter of a century, with the exception of Windows keys; there are still the three Numlock, Caps and Scroll LEDs in the upper right, and a long unused section of plastic protruding after the function keys.



▲ *The design hasn't changed much in the last 25 years*

The model we have uses Blue switch technology, with an actuation force of 60cN (slightly higher than the average Blue switch). This makes the keyboard quite a loud entry in the guide, but wonderfully tactile at the same time.

Naturally, the switch technology used ensures a long lifetime of use; over 50 million keystrokes is the universal number. In reality, of course, you're hardly going to count the number of times you've pressed a key, but the G80-3000 is built to last, both in terms of the casing and the switches. Furthermore, the key caps are laser etched to prevent deterioration over time.

One odd factor we found with regards to this design was that the F and J keys didn't have the little raised lump, designed for touch typists. Instead, the key caps are slightly more concave than the other keys. We didn't have any problems with this design feature, but it's



worth mentioning nonetheless. As a side note, though, the number 5 key on the number pad does have a raised dot.

One more addition to the features is the 1.7 metre USB cable, which also comes with a PS/2 adapter and has a Unix Code Set 3 support built in. Obviously, this is only for extreme legacy setups, but it's good to see there's still support for those who may require it.

We quite liked the Cherry G80-3000. It brought back memories of our early years in computing and it certainly feels good to use. How much use it is in a modern setup depends on what the user wants. As you can tell, there aren't any extra multimedia keys, gaming profiles or macro keys, but what you do get is a solid and dependable keyboard that costs as little as £55.

Cherry KC 4000

DETAILS

- Price: £25
- Manufacturer: Cherry
- Website: goo.gl/uj8jlX
- Requirements: Spare USB port, Windows or Mac systems

Our second Cherry model keyboard of the guide is the compact KC 4000, a flat, laptop-style keyboard designed for those who have limited space on their desks or prefer something of a mobile nature.

It's an 88-keyboard using scissor switch technology, measuring just 305 x 193 x 25mm and weighing a mere 345g. Along the top are the usual three Caps, Numlock and Scroll LEDs, with the Cherry logo at the bottom of the keyboard face.

Obviously there's no number pad here. Instead, as with any other laptop-type keyboard, you have an FN key, with the number pad being the third option for the 7, 8, 9, 0, U, I, O, P and so on keys.

The scissor switch technology doesn't quite have the rated lifespan that a mechanical switch offers, but the on-paper rating of ten million keystrokes for the KC 4000 isn't too bad a service life. On the plus side, the keys are laser etched to last longer and prevent rubbing off, but there aren't any dedicated or even third option media keys, as you would see on a laptop keyboard.

The compact design works well enough. Admittedly, having a laptop-style

keyboard for a desktop computer isn't our cup of tea. We find it too limiting and a little too small for our hands. But we can see the

become damaged by constant use.

Despite its lightweight design and diminutive dimensions, the KC 4000 is a

“It's pretty robust considering the nature of the keyboard”

benefits of having a keyboard with a tiny footprint. Incidentally, a keyboard such as this is a great benefit for server rooms, due to its size and portability.

It's a USB keyboard, with a 1.8 metre cable that's built into the rear of the keyboard itself. There's none of this removable cable stuff here – something we've come to dislike, because micro-USB ports on keyboards can

surprisingly sturdy keyboard. There's barely any flex from the matte-black plastic casing, and the keys feel solid enough when pressed – plus there's very little travel too. It's a fairly basic product, but one that has its advantages over a full-sized keyboard.

As we said, this isn't something we'd go out and buy for ourselves for our particular setup. But it's a good keyboard regardless of



▲ The compact Cherry KC 4000 will suit those with limited space

◀ It has its advantages and disadvantages, but it's a well-built keyboard

what we think of compact models. We liked its sturdy design, the feel of the keys and that it's pretty robust considering the nature of the keyboard. We also liked the fact that it costs just £25.

It's a little niche perhaps, but cheap enough to have as an emergency keyboard or as a media centre keyboard where space is limited.



Keyboards

Cherry MX Board 6.0

DETAILS

- Price: £150
- Manufacturer: Cherry
- Website: goo.gl/Jm39oX
- Requirements: Spare USB port, Windows or Mac systems compatible

Our last Cherry product in the guide is the relatively new MX Board 6.0, a more versatile keyboard with a slight bent toward gaming and media duties than the other Cherry models in this guide.

The MC Board 6.0 is a 105-key (plus four media keys) keyboard that uses Cherry MX Red switches, measures 454 x 147 x 28mm and weighs a reasonable 1.35kg. Its design is radically different from what we've seen so far, eschewing the more sedate look for one that uses LED backlighting, large rubberised wrist rest and a 2m braided USB cable.

The case is made from aluminium with an anti-grease and fingerprint coating to keep it looking tiptop for as long as possible. The key caps are quite small, with sharp angles to them. They do look good, and

▲ *It's probably a little too expensive for most users' tastes*

with the red LED backlight up and running, they certainly stand out.

Speaking of the backlight, the red LED is quite bright at its maximum setting. Thankfully, there's an FN key incorporated to the lower right of the keyboard that uses the second function of the F5, 6, 7, 8 and 9 keys. These allow you to raise or lower the brightness levels by 1%, 10% or turn all LEDs off with the exception of the Windows key, FN and Numlock, which remain lit with a blue LED.

There are three additional media keys for skip back, forward and play/pause, and

there's an extra key with the Cherry logo embossed on it, which acts as a Windows lock key. These take up the upper right-hand corner of the keyboard, where you'd normally find the indication LED for Caps, Scroll and Numlock. But instead of repositioning the indication LEDs, Cherry instead has omitted them completely, which seems like an odd design decision. We think that making the keyboard deeper, even by a few millimetres, would have opened up the indented space by the arrow keys and allowed the LEDs to be positioned. Obviously, they aren't totally necessary on a keyboard, but they're something we've come to expect and prefer.

The Cherry MX Red switches have a good feel to them. There's a low 45 cN actuation force and very little travel, and they're are wonderfully quiet; especially after using the Blue switches from the Cherry G80-3000. The supplied rubberised wrist rest attached via a couple of magnets to the bottom of the keyboard and remains in place well enough, provided you don't pick the keyboard up much.

The Cherry MX Board 6.0 is a good middle-ground keyboard. It's fine for fast action gaming, while still being able to satisfy the daily worker. There's a lot more technology at work in the background too, with a processing feature called RealKey that reduces the input lag of the keys to 1ms. Hats off to Cherry for pushing the technology envelope, but it's a feature that 99% of the keyboard-using population will never notice.

We did like the MX Board 6.0, even the crushed neoprene keyboard cover that's supplied with it. However, we're not sure it's worth £150.



▲ *The Cherry MX Board 6.0 is a stylish, good gaming and everyday keyboard*



Element Gaming Carbon

DETAILS

- Price: £89.99
- Manufacturer: Element Gaming
- Website: goo.gl/vh5306
- Requirements: Spare USB port, Windows system

Element Gaming, which is a part of Ebuyer, has an attractive range of peripherals that are reasonably priced, while offering a better than average level of technology.

The Carbon mechanical RGB keyboard is one such peripheral and offers the user a wealth in gaming keyboard features. It's a 105-key keyboard, measuring 450 x 145 x 37mm and weighing 1.2kg. It uses Kailh Brown switches, a clone of the Cherry switches but still perfectly capable and offering the same less-clicky, 45-50cN actuation force, 50 million service lifespan – although Element Gaming has this down to ten million keystrokes.

The design of the keyboard is quite unique. The dominating feature is the large aluminium plate that's bolted onto the plastic casing. The plate design fans outward, with some jagged section to emphasise an aggressive-looking gaming setup, we imagine. Nevertheless, it does look quite good, and it certainly increases the overall sturdy feel of the keyboard.

Additional to the design is a 2m braided, six-core USB cable, which, according to the technical specification, features twin magnetic filter rings to ensure a stable transfer of data. It may sound extreme, considering this is just a keyboard and one without any built-in USB ports or



▲ The Element Gaming Carbon keyboard is certainly a stylish and capable gaming keyboard



▲ The removable switches are a great idea, and it's well priced too

such, but you can't knock Element Gaming for producing lacklustre products.

As the RGB part of the keyboard's title suggests, the Carbon has fully customisable backlighting. You can set the varying colours, brightness, pulsating rate and so on with the FN key and a combination of function keys, plus, minus and some of the number keys. There are handy visual aids laser etched onto the key caps, which increase their functionality by two or three

options. While good, it does look a little cramped; what would have been, possibly, a better design decision was to make the keyboard bigger and use a strip of dedicated keys. However, the current setup works well enough.

Interestingly, included with the keyboard are a set of four replacement switches, along with the key cap and switch removal tool. This is quite possibly the first keyboard we've ever seen that includes spare switches, as opposed to spare key caps. It's a

neat idea and quite unique among the industry.

In terms of operation, the Element Gaming Carbon worked very well. It's not as big a gaming keyboard as we're used to and, if we're being honest, a wrist rest would be a welcome addition, but after an hour or so of use, we had the measure of it and it worked very well indeed.

The Element Gaming Carbon is a good gaming keyboard. There's everything the gamer looks for, including macro keys, backlighting and an imposing look, but it also works well as a day-to-day keyboard. It's not too badly priced either, at £89.99.



Keyboards

Roccat Suora

DETAILS

- Price: £79
- Manufacturer: Roccacat
- Website: goo.gl/qYNbvW
- Requirements: Spare USB port, Windows PC for Swarm software

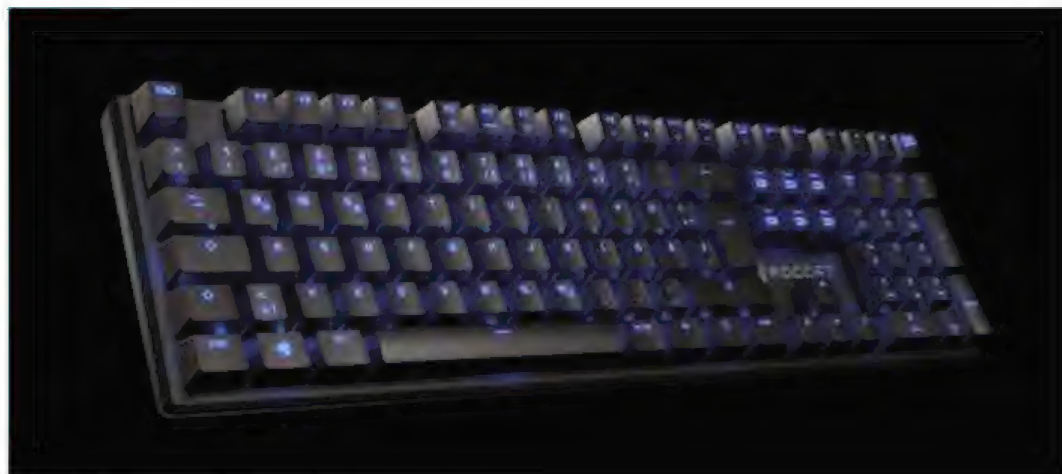
Roccat's products are some of our favourite gaming peripherals, especially the company's wide range of gaming keyboards.

The Suora is the newest member of the keyboard line and comes with numerous gaming advantages and extras for those looking for the edge while battling it out online.

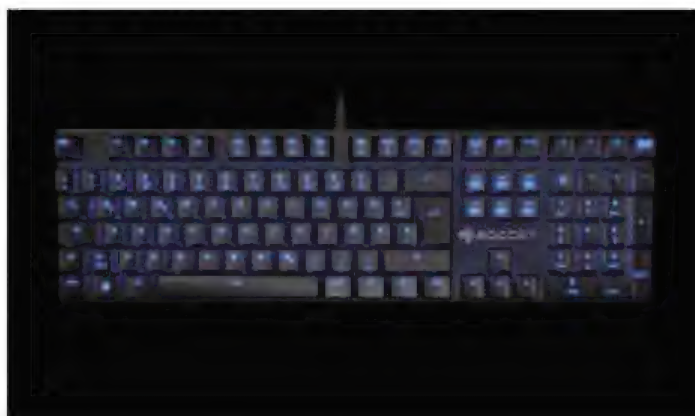
It's a 105-key keyboard, with four extra keys, measuring 430 x 125 x 35mm and weighing 1.3kg. This is the first Roccacat keyboard to opt for something different other than Cherry MX switches; this time the company has used TTC Brown switches, which operate the same as Cherry or Kailh switches but cost slightly less to manufacture.

The switches still offer 50 million keystrokes and still have the same low actuation force that the other switch manufacturers use. In truth, unless you're a keyboard expert, you're hardly going to notice the difference between the switch manufacturers.

The design of the Suora is very similar to that of the Element Gaming Carbon, in that it's a frameless keyboard setup – minus the metal plate in this case. This makes the keyboard feel a little bit snug, admittedly, but Roccacat has made sure the key caps are



▲ The Roccacat Suora's frameless design looks great



▲ It's a decent compact gaming keyboard, that's also reasonably priced

“ It's well laid out, looks good and has plenty of features ”

nicely spaced, which gives it a good feel when typing.

There's no lack in terms of quality, though, as we'd expect from Roccacat. The other keyboards and mice in the company's range have always impressed us, and the Suora is no exception. It's a solid keyboard that's been designed to take the force of a gamer, and there's the usual macro-

defining keys (doubling with the Insert, Home, Del, End, Page Up and down keys) and a subtle blue backlighting across all the keys, plus it's compatible with the company's Swarm driver set, which links all Roccacat products under a single configurable app.

Aside from the macro keys, there are also three volume keys (mute, volume up 1% and

full volume) and a Game Mode key that disables the Windows key and automatically enables the macro defining keys.

Since it's a frameless keyboard, though, it does lack some of the extras that the likes of the Roccacat Ryos has, such as the pass-through audio ports. But on the other hand, it's more compact while still having mechanical switches and other elements that appeal to both gamers and everyday users.

The Roccacat Suora is a great gaming keyboard. It's well laid out, looks good, has plenty of features and comes with the company's usual high degree of build quality. It's also reasonably priced, coming in around £10 cheaper than the Element Gaming Carbon at £79.



Matias Ergo Pro

DETAILS

- Price: £162
- Manufacturer: Matias
- Website: goo.gl/729wr5
- Requirements: Spare USB port, Windows or Mac systems



▲ The Matias Ergo Pro splits in twain and offers a higher degree of ergonomic comfort

All the keyboards in this Buyers' Guide so far have a similar design, with some aesthetic exceptions. They all follow the rectangular, standard keyboard model, which while good, doesn't really lend itself to those who suffer from keyboard-related muscle stress problems.

Usually, though, those who want an ergonomic keyboard have to settle with the lesser rubber dome or membrane type switches, but Matias has an ace in its product line: the Ergo Pro.

The Ergo Pro is the only mechanical ergonomic keyboard we've ever reviewed, and it's quite an impressive peripheral to behold. It measures 368 x 230 x 35mm in total, but it's split into two separate sections, with the QWERT/ASDFG/ZXCVB, F1 to F4 and half a Spacebar on the left-hand section and the remaining keys on the right-hand section. There's also a cushioned, gel-filled wrist rest under each section too. The two sections communicate via a bridging cable, provided in the box.

The total weight comes in at 1.7kg, and the switches used in this case are the Matias Quiet Click, which offer a more subtle click than that of Cherry's switches with a slightly better tactile feedback too. The technology is based on ALPS switches, but Matias has made some improvements in terms of the actuation force, and these

switches are rated to last for at least 50 million keystrokes over the ALPS's ten million.

Aside from having two sections and thus being able to angle inwards (or whatever works best for your hand

topples over. Likewise the Tab, Escape and even the number 1 key on the left-hand section topples the section over. It quickly returns to its original position, and if you're resting your hands on the pads, the

right Alt key instead of Space, but after an hour or so, we could use it as efficiently as any traditional keyboard.

The two sections obviously benefit those who suffer from keyboard strain. Even if you don't suffer, the Ergo Pro makes for a comfortable typing position. The odd toppling-over design flaw, though, is a bit of a nuisance, as it could have easily been rectified with another foot along the top of the keyboard sections.

Overall, though, the Matias Ergo Pro is an interesting keyboard that works reasonably well, and it's not too badly priced at £162 – via the Keyboard Company.

“ Certainly one of most extraordinary keyboards we've ever used ”

positions), the Ergo Pro has three folding legs, with rubberised feet – two legs for the base of the keyboard sections and one for the top. These put the sections into a variety of incline and decline angles, depending on how comfortable you feel when using the keyboard. But – and this is something we found a little odd – due to the position of the top legs on the underside of the keyboard, if you were to hit the Del key (on the right-hand keyboard section), the keyboard is off-balance and

keyboard sections don't move, but it's a really strange design.

Despite that slight flaw, the extras don't stop there. The Ergo Pro has three USB 2.0 ports, four dedicated keys for undo, copy, cut and paste, and a selection of media keys operated through the F7 to F12 keys via the FN key.

The Matias Ergo Pro is certainly one of most extraordinary keyboards we've ever used. The positioning of the keys seems a little strange at first, and we had the annoying habit of hitting the



Remembering... The Sentinel

We recall an immense game that pushed the limits of the 8-bit world

The *Sentinel* was by far one of the most ambitious games ever developed for the humble 8-bit era and was well received by critics and gamers alike.

Consider *The Sentinel* as an elaborate and very long-drawn out game of chess, where each move takes considerable thought, patience and time. The result of course, much like chess, is a complex strategy game with moves, counter moves and finding positions of attack.

An ultra-powerful entity, the Sentinel, absorbs the energies of 9,999 worlds and Earth is next on its list. Although powerful beyond belief, there is a way to combat the Sentinel and that's by absorbing energy from it.

The Sentinel, however, has other plans and has dispatched various sentries throughout the many worlds it oversees, who are actively seeking you out. This is where the game starts to get interesting.

You start by getting an overhead map of the world you're currently trying to liberate. Following that, you'll find yourself in the 3D Vector graphic landscape that still to this day looks mightily impressive. You can, from this point, look around and try to locate the Sentinel (who will always occupy the highest point) and factor in the most effective way to reach it. To move in this landscape you have to look at a square and create a Synthoid (a robot) on it, then transfer yourself into the newly created robot. Doing this takes energy, but you can replenish energy by looking back at the robot you used to inhabit and absorb it and its energy.

However, it gets a little more complex. The Sentinel and Sentries will scan the landscape for squares containing more than one unit of energy (which means you). If they can see such a square, then they'll reduce the energy of that square to one unit, which then creates a tree randomly on the landscape, which you can then in turn absorb.

Additional to all this, if a sentry can see you but not the square you're inhabiting, then they can create a 'Meanie' near you that will hyperspace you to another location on the map and reduce your energy.

There's more to it, but essentially this continues until you finally manage to absorb the energy of that current world's sentry. Once defeated, the game will offer you a code to continue to the next world.

Its History

Originally devised and programmed for the BBC Micro by Geoff Crammond, *The Sentinel* found its way on to virtually every computing platform going – even the PC.

The conversions to other platforms were mostly programmed by Crammond himself, but the Spectrum version was by Mike Follin, ST and Amiga by Steve Bak, and the DOS version by Mark Roll. More recently, in 1998, a PC sequel, *Sentinel Returns*, was developed by Hookstone and published by Psygnosis/Sony – with a musical score by John Carpenter, no less. However, the game didn't grab the attention like the original, with some pretty harsh reviews following the release. However, there are a number of remakes

Did You Know?

- There is only a finite amount of energy in each world. If a unit of your energy is absorbed, the program will create a random tree to compensate.
- The US version was called *The Sentry*.
- It took six months to program the first BBC version.
- The 3D landscape worked on 8-bit machines thanks to the graphics engine only needing to render a small percentage of the screen. This gave the illusion of a real-time walk through a 3D landscape.

from indie developers, with some being rated higher than anything that was ever officially released. Check out Georg Rottensteiner's version (goo.gl/HLixlo).

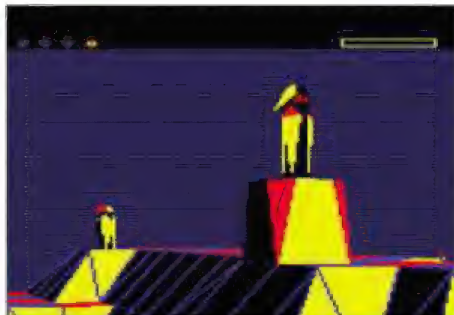
The Sentinel was a true masterpiece in every sense of the word. Amazing graphics, great sound effects from Tim Follin on the Spectrum version and with 10,000 worlds to beat. There are probably still people out there playing *The Sentinel* from the original copy back in 1987 – and fair play to them.

The Good

Incredible graphics, long thoughtful gameplay, absorbing story.

The Bad

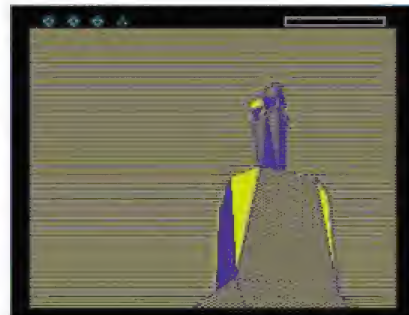
Awkward controls, perhaps too long. **mm**



▲ The original BBC Micro version of *The Sentinel* was incredible



▲ The Amiga version obviously benefited from better graphics and more memory



▲ The Spectrum version is my personal favourite

Top 5

Technology Mascots

The happy chappies making technology more approachable

1 Tux

What says open-source operating system more than a cartoon penguin? Probably quite a lot of things, but when the search was on for a Linux mascot, black-and-white polar birds were at the front of the queue. Why? Because Linus Torvalds, the father of Linux, was something of a fan.

As for the name, apparently, it comes from (T)orvalds (U)ni(X), according to this: goo.gl/H3XmrP. Whether this is true or not, we're not sure, but what we do know is that it gives us an excuse to print pictures of penguins on a semi-regular basis – and that's something we can all get behind, surely?

2 Android's Android

Technically, Google's mascot for its Android operating system doesn't have a name, but rumour has it that he's unofficially known as 'Mike' (goo.gl/VsPhv). Whatever the case, he's fast become one of the most recognisable logos in the world.

Starting off life as a simple green robot, the Android mascot was designed by Irina Blok and has since expanded into more exciting designs (www.irinablok.com/android). You can have a go at making your own with the Androidify app from the Google Play store.

3 Duracell Bunny

Amazingly, the world's most famous toy rabbit has been going since 1973 (but probably not on the same batteries). However, it wasn't until the 80s that the first television ads appeared (youtu.be/kaF6FxmJk).

Oddly, though, while the Duracell bunny is a familiar sight to anyone living in Europe, you won't find it anywhere in the US. You will, however, encounter the Energizer Bunny. It's said that Duracell failed to renew its trademark, and Energizer, after producing a parody of the Duracell ads (youtu.be/qiFQsxGUQOI), trademarked its own instead.

4 Firefox

If you look at the Firefox logo, you might well think it's an image of a fox, because... it is. But the name 'firefox' is a nickname for the red panda, a herbivorous animal that lives in the Far East (goo.gl/i1jlg).

Panda or fox, though, the logo is instantly recognisable, and as far as we're concerned, it's much better than Chrome's, which looks more than a little like a Pokémon Poké Ball. To be fair, though, if it is a Poké Ball, then there might be red panda inside it.

5 Clippy

Time, now, for the joke entry. Designed by Kevan J Atteberry, Clippy was, as the man himself says, "probably one of the most annoying characters in history!"

The idea of the Clippy Office Assistant came about, apparently, from a misunderstanding of research by Clifford Nass and Byron Reeves, which theorised that people communicate with their computers the same as they do with people (goo.gl/wqmXKi), using the same part of the brain. But as this video suggests, you don't actually need to anthropomorphise your computers if people are already using that part of the brain: goo.gl/qHjGDj.

If only someone had told Bill Gates sooner... **mm**



▲ Red pandas: surprising rubbish at programming web browsers



Restricted Access: Internet In China

We've all heard news and stories about China's internet access, but what's the truth?

As with so many things in our daily lives, the internet is something we often take for granted. It's just always there, and whenever we want something, need to look up a fact or simply jump on Facebook or Twitter, we can. It's ubiquitous, and we're lost without it. Just ask anyone how desperate they feel in a power cut or when their ISP is having problems. You know, first-world problems. We need the internet, pure and simple.

Spare a thought, then, for the people who live in countries where the internet isn't so freely available, certainly not in the way we expect it to be. Some countries look on the internet very differently and don't see it as a simple tool for information, communication and entertainment, but instead see it as a potential way to bring chaos to the populace or campaign against the government.

You may think this sounds a little hyperbolic, but consider that the public with internet access in Cuba are reported to around 5% (and that's through one of only two state-owned and monitored ISPs), and Iran also strictly monitors any internet access, with strong reprisals for anyone who attempts to circumvent the restrictions. The internet may be seen as the poster child for free speech in many countries, but not all. Many countries with high internet censorship also suffer from some of the slowest speeds and throttling too, which doesn't help matters.

There are many countries that place restrictions on the public's internet access, even including places like Germany, but when the issues of internet censorship and control come up, it's usually China that springs to mind. But why?

Great Firewall Of China

China is well known when it comes to strict governance of its population, and this translates to the internet too, with what some may say is the most successful and impressive implementation of censorship ever put into action. The crux of this lies with what has become known as the 'Great Firewall'. This is a very complex system that monitors and filters content for internet users in China, and allows the government to control what people are allowed to view online.

When China first embraced the internet in the late 1980s, plans were put into place, even that early on, for a system of control. Despite naysayers claiming this kind of control was impossible and that trying to police the internet would be a waste of resources, China's Great Firewall worked and worked well.

Now a very complex system, paired with what is called the 'Golden Shield,' a method of internal surveillance used by the Ministry of Public Security, China's methods have allowed the government to achieve what many other governments would

probably like, even if they don't publicly admit it. It's allowed China to both prosper, making full use of the internet in terms of business and government transparency, but ensuring any anti-government or otherwise unwanted activity is impossible. It has control and freedom, even if we users in the West would undoubtedly find the whole thing far too restrictive and controlled for our liking.

The control itself is a series of advanced content filters and blocks that monitor people's usage and prevent access to sites or content deemed unsuitable. The government of China blocks

“ China has a lot of ISPs, which may seem odd for a system that's so controlled ”

obviously troublesome sites in terms of its regime and policies, such as many western ideology and political sites, including a lot of Western publications and newspapers. While these blocks were heavy handed in the past, blocking entire websites, China's systems are now much more advanced, and individual pages of sites and specific results in search engines can be blocked instead, allowing a more surgical level of control. Various specific terms can also be blocked, meaning actual user searches are monitored and controlled too. Users aren't necessarily blocked from the internet, though, and instead are temporarily barred from searching, while other internet sites remain available. This was introduced when using sites like Google and is a little less controlling than many outsiders may have thought, even if it's still something Western users couldn't put up with.

China has a lot of ISPs, which may seem odd for a system that's so controlled, and unlike Cuba, these aren't owned by the government. However, updated restriction lists are sent out by the government on a regular basis, which ISPs quickly integrate, lest they face repercussions. There are a large number of people with the sole job of policing the internet in China, and they sift through everything, quickly blocking and censoring as dictated by the government. A heavy target for control is social media, as this is seen as an easy way for people to interact and, in turn, possibly concoct anti-establishment plans. Therefore, the likes of Facebook are usually heavily restricted and monitored.

The censorship of the internet isn't just used to hide certain information from the populace, but is used greatly to protect and promote the government itself. There's a lot of paid-for promotional content about the government posted online and, using censorship, any anti-government content is limited or removed quickly. This is to prevent any potential uprising or movements, especially those that take place in real life. Any plans for a real world march, for example, are quickly shot down by the censorship system, meaning the government essentially controls the voice of the people, preventing any dissidence.

It's easy for those outside of China to look in and see an unfair and restrictive system, and compared to the freedom we have, that may be true, but in truth, the measures put in place in China are a lot more subtle and targeted than many think. The people still have a great deal of internet freedom, and most of the censorship is purely for political reasons. Even some levels of political satire are allowed, as long as it doesn't directly attack the high-level people in power, of course.

North Korea

China may get most of the press in terms of internet control, but compared to North Korea, China is a veritable advertisement for online freedom. The internet as we know it doesn't even exist in North Korea, and instead it's replaced with a locally hosted and controlled system. This is called the Kwangmyong, and it's a very limited isolated internet consisting of a few thousand sites. It has a search engine and the usual selection of news and current affairs sites. External sites can even be requested at times, but instead of actual access, sites are downloaded, censored and then made available in edited form locally from internal servers. The site isn't live, so there are no concerns about any unsuitable outside content.

As a North Korean, you'd actually be very lucky to even have this kind of access, because despite being free to use, computers are far from free, and their cost for the average North Korean is huge and simply unobtainable by most. This isn't even the biggest problem, because people need government permission to even own a computer. Needless to say, the internet isn't a common sight, unless you're a government leader or a relative, or an online security tech or well-off student.

North Korean internet infrastructure is also limited. It's reported that there's only a single high-speed cable linking the country to the rest of the world, instead of large collections of cable as seen in other countries.

Wireless technology isn't all that popular, although there is a small mobile network. This means visitors to the country can actually use 3G to get internet access, but citizens aren't allowed. Reports have shown that some citizens illegally get internet access close to the Chinese border, piggybacking onto Chinese networks. This gives them access to an actual, live internet, but only to China's already restricted internet.



▲ North Korea's internet, the Kwangmyong, is an internal network that's heavily restricted

That said, as a visitor to China, there are things that are useful to know beforehand, especially if you're planning to use the internet as you normally would when on a trip. Be prepared for some culture shock.

An Englishman In Beijing

As a traveller to China, you have to be aware of the very different approach to the internet the country has, and you can't expect to



▲ A lot of people use public internet access location such as cafes and gaming centres in China

have the same level of accessibility you have at home or elsewhere in the world. It may not be the ultra-restricted access you may have thought it was, but it's still quite controlled, and a foreign passport won't grant you any special treatment.

Actual physical access is different in most places throughout China, especially on the mainland. Wi-fi access is quite rare, even in hotels and cafes, where you'd expect to find it. Higher-end hotels are likely to have wi-fi, but don't take this fact for granted, as it's not guaranteed. Instead, many places use wired connections and that's if they have internet access in rooms at all. Some hotels have a dedicated 'business centre' where people can use the internet, and some have no internet access whatsoever.

Internet speeds in China can also be a major problem, whether due to issues with physical infrastructure or filtering and control. A report by China Daily (www.chinadaily.com.cn/china/2016even) claims the average broadband speed in China is around 9Mbps, placing the country 91st in global internet speed rankings, with South Korea being number one with an average of 26.7Mbps. When you consider China has an internet user base of around 688 million (which is one in two citizens), that average is very low. This means pages can take a long time to load – even the more basic sites – and as a Western user used to faster speeds, you may find internet use a little on the frustrating side even when you do get online, and that's before the censorship hits.

As we've mentioned, a lot of sites we may take for granted are not available within China or are, at the very least, restricted. Social media is often limited solely to the Chinese variant, and foreign localisations are not permitted. This applies to most forum-based discussions. Don't expect to be spending much, if any, time on Facebook.

A well-known issue most will have some knowledge of is Google. The internet giant has famously had problems with China, and although it's no longer totally blocked, it's still very restricted, and you may wish to use another, less problematic search engine. Google Mail is available in some capacity, but it's far from reliable. If you're a major user of Google's services, it's a good idea to look up some alternatives to use while you're in China. It'll be easier to avoid problems. You may even wish to forward your emails to another client temporarily, due to Gmail's potential unavailability.



▲ Google is one of the most famous internet companies to face resistance in China

Workarounds?

The seriousness of the restrictions in China by the government doesn't make it a good idea, but people do find ways around the myriad of censorship measures. As always, no matter what measures are put into place and whatever potential repercussions are, someone will always find a chink in the armour.

A popular method for Chinese users wanting access to restricted content lies with VPNs. The use of VPNs allows users to bypass the restrictions, as it does when people use the technology to fool region locks on content, but it's a solution that's greatly diminished, as the government's systems soon evolved to be able to detect and neutralise VPN software. It may

The 10 Most Censored Countries

China and countries like North Korea may be well known in terms of internet censorship, but there are many more that take steps to limit internet access, as well as general cultural censorship. Here are the top ten, as listed by the CPJ (Committee to Protect Journalists - cpj.org).

1. Eritrea
2. North Korea
3. Saudi Arabia
4. Ethiopia
5. Azerbaijan
6. Vietnam
7. Iran
8. China
9. Myanmar
10. Cuba

As you can see from this list (circa 2015), China is actually a low entry at number 8, with North Korea being the second most restrictive country. The first place is taken by Eritrea. This east African nation has closed off all outside access to news coverage, with the last international correspondent apparently being removed from the country in 2007. All media is controlled by the state, including the internet, the services and gateway of which are all controlled by the government, and even native members of the press are under a constant threat of arrest should anything they do be seen as anti-state. Journalists are often jailed, and several have been exiled from their own country.

Internet access, if you're lucky enough to have it, is limited to dial-up connections and, according to UN International Telecommunication figures, less than 1% of the country goes online. The general controlling body is the state-owned EriTel telecommunications, and any ISPs must work with it to deliver internet access.



▲ You can see ahead of time if sites will be blocked by China's firewall, such as Micro Mart's site, which appears fine



▲ Other sites aren't so lucky

still be possible to use such measures, including use by visitors to the country, but in truth, it's probably best not to bother, and go with the flow instead.

Even with no reliable workaround, you can prepare a little and check site access ahead of time, to give you an indication of which of your favourite sites you'll be able to access. Website **www.greatfirewallchina.org** is a useful tool that can test websites and see if they're blocked by China's Great Firewall. Simply enter the address and you'll see which regions, if any, can access the site. We found Micro Mart was perfectly fine in all regions, but the BBC was blocked everywhere, probably due to news coverage and some specific programming.

This quick evolution of monitoring is another reason many tech experts are convinced China's approach to internet control may

Pro Gaming In China

Despite the strict laws and control placed on the internet in China, the nation is renowned as being one of the most successful in terms of competitive gaming. In particular, Chinese teams for games like *Dota 2* and *League of Legends* are considered among the best, and gaming in China is taken very seriously by fans, especially with eSports.

According to **Gosugamers.net**, the current top 10 teams in *Dota 2* include three Chinese teams (NewBee, Vici Gaming Reborn and LGD). *League of Legends* also has three teams from China in the top 10 (Royal Never Give up, Edward Gaming and World Elite). This is a clear indication that internet use in China may be restricted, but this control isn't as severe as many believe.



▲ Chinese gamers have dominated many eSports competitions and national teams are usually found in the top 10

make it out of the country and be adopted by others – if not for the same total control use, for various security concerns, including law enforcement and national security. It's certainly not something the general public would want, but for various official uses, it's clear to see why it's a desired approach to take.

All this leaves internet users in China, at least the more casual everyday user, without any choice but to simply deal with the restrictions, and that includes visitors. There'll always be technically proficient users who can find ways around any measures, but the government's ability to adapt successfully deters and controls the majority of internet use.

Conclusion

The internet is seen as a global tool for communication, and it brings people together, regardless of their location. For some, however, the internet isn't as freely available, be it due to economic or political reasons. It's important to know the state of internet access in destinations you plan to travel to, and we hope our brief look at China and a couple of other heavily restricted online nations gives you some idea of what to expect and what to prepare for. **mm**

Great Android Apps For Summer

Let your phone help you survive the coming months of potential sunshine

Say what you like about the UK, but at least we get a good variety of weather. Sometimes, it rains, sometimes it pours. Other times, it drizzles or spits. Then, as a bit of a bonus, we get showers and storms.

Of course, sometimes, it doesn't rain at all. And when the sun shines for more than a week, we call it summer.

Actually, though, even though it might not seem like it, summer officially began in the UK on 1st June. Perhaps you've seen a few glimpses of it? So far, we haven't had much consistently good weather, but we're going to be optimistic and say the end of July will be warm enough to start thinking about hitting the beach or planning some other activities for the summer.

And seeing as you'll probably have your phone with you, we've put together this list of Android apps that we think will make the year's hottest season even more fun. Sadly, however, none of them can stop the rain. (All apps are free, unless stated otherwise).

Weather Apps

Why get caught out by bad weather if you don't have to? There are loads of weather apps for Android, including an official one from the Met Office and one from the BBC, as well as AccuWeather, Weather Underground and Yahoo Weather. It would probably take you hours to look at all the weather apps available and to compare their many varied features.

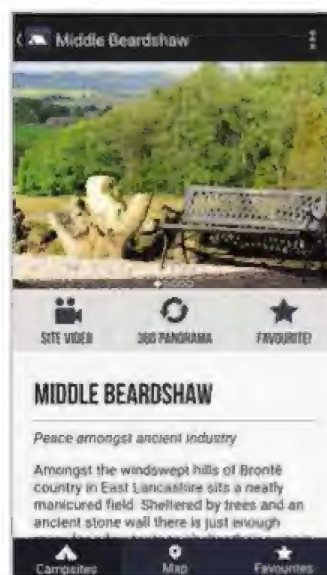
Of course, one thing, arguably, unites them: their general lack of accuracy. It might be a cliché to say weather forecasts are rubbish, but we have several weather apps on our phones, and most of the time, they all say different things for the same days.

For that reason, our pick of the weather apps is the perhaps ironically named Precise Weather YoWindow. We have no reason to believe it's any more on the ball than the other available apps, but it does feature a lot of attractive animations and a great design.

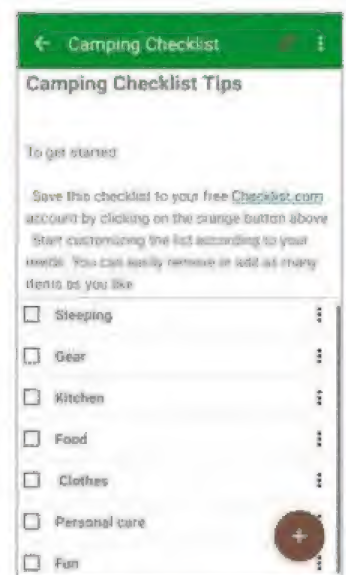
Swiping across the screen enables you to quickly see what the weather will (supposedly) be during the day, complete with an animated image of a landscape (there are seven different locations to choose from). Sadly, though, it doesn't appear to include any UV index information, which can be found in many other apps, so it might be worth getting another app too, if that concerns you.

Events App

If the sun is shining, then you might choose to spend your days lazing on the beach reading a book. But if the skies are grey, then



▲ Campr



▲ Camping Checklist

it could be a good idea to find entertainment elsewhere. You could just sit indoors watching old episodes of *Jeeves and Wooster* while the rain comes crashing down outside (like our editor once did on an unsuccessful camping trip sometime around 2005), or you could use an events app to find out what's going on in the surrounding area.

There are plenty to choose from, but a few that stand out are Eventbrite, Nearify and All Events in the City. They all let you choose from a selection of things that interest you, such as music, art, sport and so on, and then they bring up a list of what's going on where you are or in an area you define.

In terms of the events they list, there's little difference between the apps, but they each do things so in their own styles. Nearify, for example, seems to offer more detailed information, but it also looks a bit more cluttered than the other two. Personally, we like Eventbrite most, but we'd probably install Nearify as well.

Water Quality Apps

Assuming the weather is clement, you might want to head to the beach. And if you're feeling brave, you might even get in the water for a quick dip or a swim. Unfortunately, not all beaches are ideal for swimming, and the quality of water varies from place to place.

If you're living in or headed to the South West, then the BeachLive app from South West Water might be of interest. Simply tap on the name of a beach from the list, and you'll get a short summary of its status, a very brief description of the beach, a map showing its location, its rating according to EU Standards and any awards it's received. It's not hugely in-depth, and the South West focus means it's naturally highly limited, but it could be useful if you're going to be in that area over the next few months.

Sadly, there don't seem to be many apps that cover the water quality of beaches in the UK. Waterkeeper Swim Guide looked promising, but in spite of its Play listing saying it supports the UK, it only seems to show beaches in the US.

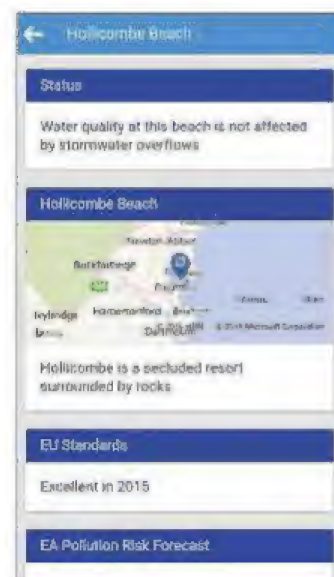
The SAS Safer Seas Service app is more useful, however, being UK focused. As well as indicating the bathing water status, it gives a short description of the beach, lists facilities, and tells you about watersports in the area and if there are any sewage overflows nearby.

Camping App

Instead of heading towards the coast, why not consider the countryside instead? All you need is the great outdoors and your will to survive. That said, it probably wouldn't hurt to also pack a



▲ **Precise Weather YoWindow**



▲ **BeachLive**

tent, a sleeping bag, lots of tinned food and a lighter. What else should you take, though? Install Camping Checklist on your phone and you'll soon find out. It is exactly what it sounds like: an app that lists all the things you'll need to make sure your camping trip goes off without a hitch.

If you've already got all the stuff you need, though, then you'll need to think about where you're going to pitch up. In that case, you could do worse than installing the Pitchup.com app, through which you can search for and book camping spots, as well as find locations for caravanning. The app includes plenty of user reviews, and you can filter the results for lots of different factors, including sites that offer washing-up facilities and those that allow campfires.

Also worth checking out are AA Caravan & Camping Guide and Campr. The latter includes videos and 360° panoramic images; it looks good, but is limited in the areas it covers.

Rio Olympics

From Friday 5th to Sunday 21st August, Olympic fever is heading to Brazil. Hopefully, all the worries about the Zika virus will turn

out to be unnecessary, and we can all enjoy the sporting exploits of the world's greatest athletes (some of whom might also be free of performance-enhancing drugs).

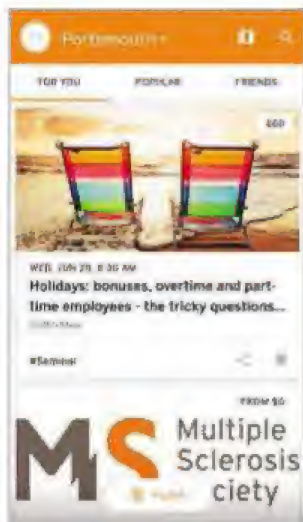
There are plenty of choices for apps, including the official IOC one and another, confusing, that's credited to 'Rio 2016'. The IOC app, however, is something of a cop-out, because it's just a menu made up of links that open in your phone's web browser – disappointing for an organisation that brings in millions of pounds.

Among the many, many third-party options, there's Brazil Games Rio 2016 Schedule and NBC Olympics – News & Results.

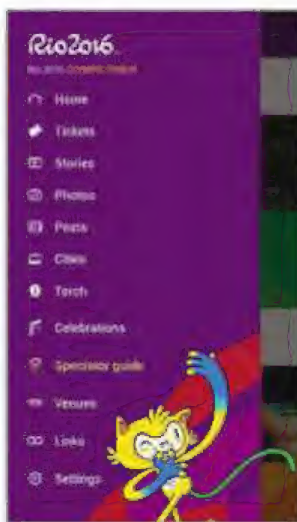
Whichever one you choose, it should be easy to follow what's happening, when it's happening and who it's happening with. **mm**



▲ **Nearify**



▲ **Eventbrite**



▲ **Rio 2016**

Steam Alternatives

Steam is the biggest digital storefront for games, but it's not the only option. We look at the alternatives

Valve is undoubtedly the major proponent of digital game delivery for PC and certainly the most successful. Its Steam platform was the first digital gaming distribution services, starting out life with the launch of *Half-Life 2* in 2003. Over the last decade or so it's been around, Steam has revolutionised PC gaming and has had a huge impact on gaming as a whole, giving users an easier and more convenient way to grab their games. As it matured as a service, Steam began to offer more and more content and expanded into other areas, embracing more than just mainstream games.

Today, Steam is an unstoppable juggernaut in PC gaming, with over 120 million registered users and thousands upon thousands of games. It's become synonymous with gaming as a whole and its known throughout the world, even to people who don't play games, such is its success.

As with anything successful, copies of Steam were inevitable, and Valve's platform would be met with a myriad of contenders. These would come in various guises and specialities, and all would aim to take some of the action away from Valve's success – or would they?

Today, we know that any competition, no matter how well received, couldn't topple Steam, and it remains the single most popular PC gaming platform around, but that's not due to a lack of potential challenge. There are many alternative services now available, and some argue that these are actually superior to Valve's offering.

We're going to take a look at some of these alternatives to Steam and we'll see what each offers and how they may be more beneficial for some users than Steam.

Steam store.steampowered.com

We have to begin our look at Steam alternatives with Steam itself serving as the benchmark. Steam is the big boss of retail gaming platforms and for good reason: it's huge, offers any game you'd care to think of, and has a wealth of extra features designed to reel in gamers and keep them happy. Then there are those summer sales, ohhh, those summer sales.

Steam was the original platform of its type, and although its start was shaky, with plenty taking offence at having to be online to grab their copy of *Half-Life 2*, the service pushed on to become the monster it is today. Now, Steam is the de facto online gaming store, and the majority of the PC gaming world has an account.

Steam offers games from every publisher and developer, and save for a few omissions due to legal reasons or exclusives, there's next to nothing you can't find on here. All the most recent games are made

available, often with specific exclusive deals and extras, and there's a huge catalogue of older titles. Although Steam doesn't venture too much into true retro territory (there are other services for that, as we'll soon cover), it's the best place in the eyes of many for the serious gamer.

As well as the games, Steam offers a full social element, including user forums, recommendations and even a trading card system. You can earn rewards just by playing games, and all your games are kept in a neat and tidy collection, accessible from any PC.

As good as Steam is, it's also become infamous in some aspects, most notably the highly experimental and now hugely popular early access system, which lets people pay up front for unfinished, still in-development game builds with a promise of the final package at a later date. This has been host to a few decent games, but on the whole it's seen by gamers as a breeding ground for poor and often downright irredeemable trash. Just pop over to YouTube and watch Jim Sterling's series on Steam's early access if you want to know how bad things can get.

Despite the appalling level of quality that seeps into Steam's early access model, it's still a massive hit and has made it possible for anyone to get started in game design and earn some money. Steam even dabbled in the sale of game mods (modifications), although this backfired and was soon dropped.

Part of Steam's major success is its inclusion of a developer API that allows programmers to directly integrate Steam features into their games, including Steam's PC version of console achievements and trophies. It brings the developer and the gamer closer, and makes Steam a very attractive platform for companies wishing to make the most of digital sales, with little risk thanks to Steam's built-in security. Oh, and did we mention the summer sales?

Steam is huge, there's simply no denying this, and you wouldn't be alone if you thought no other option comes close to matching Valve dominance here. This may or may not be true. Let's see...

Origin www.origin.com

Origin is Electronic Arts' answer to Steam, and the company has stated during investor presentations that it wants Origin to match Valve's service. This is odd, because Origin is limited to the distribution of EA games only (save for a couple of exceptions). Origin has been designed as a way for gamers to purchase EA titles online through an all-encompassing service that features social elements and other extras, much like Steam.



▲ Jim Sterling has become a YouTube favourite, thanks in part to his coverage of poor-quality Steam early access titles



▲ Steam

Origin has around 50 million registered users, making it a very successful service, but it's far from the numbers of Steam. The limitation of EA-only titles is the major problem here and is where Steam and many other digital distribution services succeed, selling games from many different companies. Most other options sell EA games too, meaning Origin isn't as big a temptation as EA may wish.

That said, Origin does offer users exclusives and some good deals, and with EA's massive range of eminently popular sports titles, as well as hits such as *Battlefield* and *The Sims*, there's plenty of scope here for EA fans.

Uplay (Ubisoft Club) uplay.com

Possibly the most disliked gaming service around at the moment, Ubisoft's Uplay is a proprietary gaming platform that's evolved to be both a gaming store and an addition to Ubisoft's games.

Like Steam, Uplay brings with it such things as gaming achievements and social elements, but a big focus here is on giving players of Ubisoft's titles something extra. As people play the company's games, they earn Uplay points that can be redeemed via the store for rewards, such as in-game skins, levels, OSTs, desktop wallpapers and more. The PC client acts as a gaming store and game launcher too, and Uplay is directly integrated into Ubisoft's games. Uplay is cross platform, meaning one account covers the service on PC and console, and it also serves as a form of DRM.

Sadly, Uplay is criticised and outright hated by the majority. It's often condemned as being sluggish and unwieldy, and some games have suffered from serious server and DRM problems, such as *Far Cry 3* on PC, which was rendered unplayable for some. Others see the rewards offered as pointless and uninteresting, and the need to log into Uplay and/or create an account, even on console, is enough to turn people off entirely.

It's no secret the gaming public don't like Uplay, but the service still persists, and Ubisoft seems keen to make it work.

GamersGate www.gamersgate.com

Now this is more like it. GamersGate (not to be confused with the recent gaming industry controversy) is a good alternative to Steam and, like the Valve option, it offers a huge collection of games for PC through its online store and isn't limited to a specific publisher.

Originally created by Swedish publisher Paradox Interactive as a way to make its games more easily available to its fans, the service soon evolved to encompass more and more games, leading it to the collection of over 6,000 it has today.

Achievements, game tutorials and guides are featured, and the service has shunned DRM, meaning it hasn't run into the same problems with copyright protection as other services. It functions much like Steam in terms of layout and access of your games, and there are regular sales and deals to be had.

Overall, GamersGate is one of the better alternatives to Steam, offering as it does a large range of games with few limitations on publishers and deals. Well worth a look.

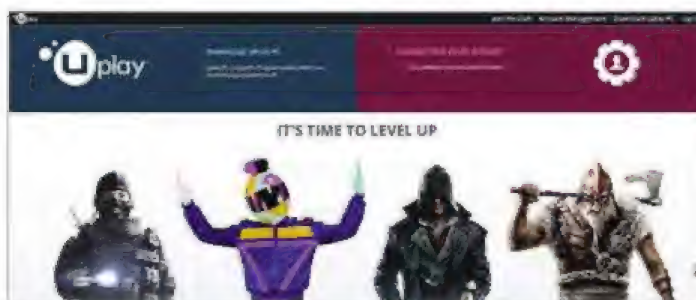
GOG.com www.gog.com

GOG.com is arguably considered the biggest competitor of Steam, even if it doesn't have the same diverse range of mainstream games. The service started out life as 'Good Old Games' and carved a niche for itself selling old games that were altered to run on new machines. It quickly became a favourite service for retro gamers.

Eventually, GOG began to sell more recent games and made a big push for indie titles, not to mention parent company CD Projekt's highly acclaimed *Witcher* series on PC and Mac. Now known simply as GOG.com, the service has its own new Steam-like client (GOG Galaxy), and the site remains a pioneer of DRM-free releases, making it a big favourite of many gamers.



▲ Origin



▲ Uplay



▲ GamersGate



▲ GOG.com

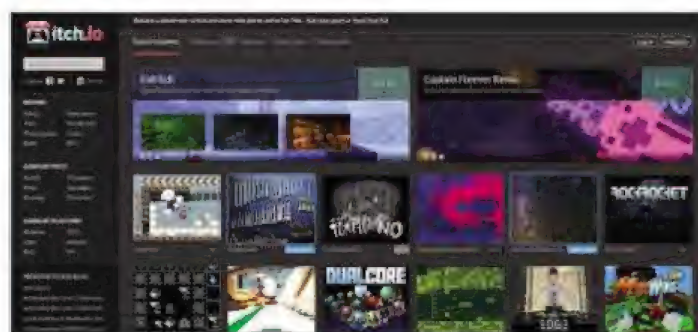
GOG.com is also known for its regular sales and offers, many of which feature huge discounts on single or even collections of games. The site even gives away some games for free as part of a promotion. Most recently, it gave away the classic *System Shock 2*.

GOG.com is a superb site, and if you're an older gamer looking for classic titles to play on new machines or you wish to dip into the indie market, it's great. Sadly, the lack of mainstream modern releases means it's not quite as attractive as some alternatives, and if you prefer more contemporary titles, you'll probably need to look elsewhere.

Itch.io

Itch.io isn't all that much like Steam or other alternatives. Instead it's a web portal for users who want to upload their own games for public consumption. Developers can charge for games, with 10% of the money going to Itch.io, and many games are released free of charge. It doesn't host any commercial games, only indies, but there's a massive collection available, with just the free games amounting to over 32,000 results.

With such a number on offer, you'll obviously find a lot of poor-quality titles, but it's surprising just how many good games you can find on Itch.io, even in the free category, and it's a great service for aspiring coders who want to make themselves known and build up a portfolio of their work.



▲ Itch.io

In Summary

We've covered quite a few Steam alternatives, as well as Valve's store itself, and in this brief look we've found that there are stores that cater for various types of gamers and not all are after Steam's jugular.

Sure, Steam has its competitors, with the likes of GamersGate and Green Man Gaming being particularly noteworthy, offering much the same array of features. However, services that many consider as being directly opposed to Steam are, in fact, not. GOG.com, for example, may be a very successful service, but because it doesn't offer contemporary games, instead focusing on retro and indie games, it sits in a different market. Sure, it takes away from Steam's indie sales, but Steam has plenty of other revenue streams. Likewise, purely indie-focused options like Itch.io and Desura don't really compete with Steam. If anything, there's more competition between these services and the likes of GOG.com.

When all is said and done, Steam doesn't really have any major competitors that represent much of a threat, and this isn't just because of little threat from alternatives, but is instead due to the unrivalled selection of games and a mass of features others simply don't or can't offer. EA and Ubisoft's options are hamstrung due to titles limited to their own catalogues, and even if all services sold the same range of titles, Steam's extra features give it the edge, as do the summer sales we have mentioned, which are well known for emptying wallets the world over.

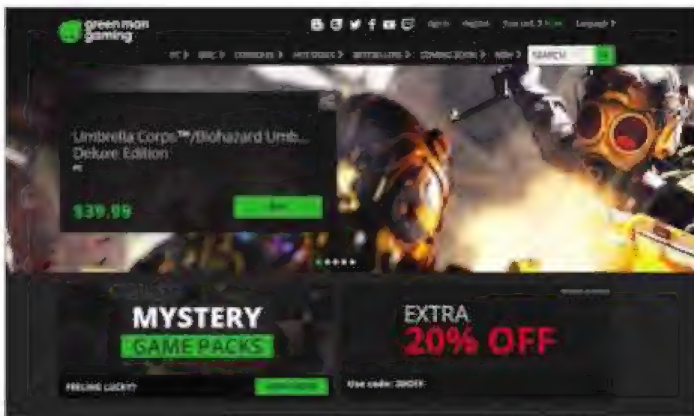
Steam may be the best, but it's not for everyone, and that's why competition can survive, by offering titles not found on Steam and focusing on specific themes and market areas. For this, we're covered, and just by visiting the sites listed here, you'll find pretty much anything you could want, Steam or otherwise.

Green Man Gaming

www.greenmangaming.com

Like GamersGate, this is more of a direct competitor to Steam and features a very similar service. Green Man Gaming is a UK-based alternative to Steam that also hosts its own social networking site, Playfire. It has more than 5,000 games available, and the Playfire service grants access to achievements and other integrated features, again similar to Steam.

All in all, Green Man Gaming is a worthy competitor to Steam, but it's been through some controversy in the past. Most notably, the service has been accused of selling unauthorised keys by some publishers, including Activision and Ubisoft. This has resulted in Green Man Gaming now clearly stating where redemption keys come from on the site.



▲ Green Man Gaming

Green Man Gaming managed to secure a deal with Nintendo UK in 2015, so it now sells digital copies of games for the Wii U and 3DS.

Desura

www.desura.com

Desura is another indie-focused store, and it functions very much like GOG.com in both appearance and function and also includes its own client. It includes DRM-free downloads, as well as Steam keys for games listed on the site, as well as social elements and the ability to launch games from the site itself.

Although it sits in the same market as Steam, GamersGate, GOG.com and so on, Desura isn't as much of a competitor to Valve's service due to its focus on indie titles, and even GOG.com isn't seen as a real worry, since Desura doesn't deal with older games. Because of this, the service sits quite nicely in between the much bigger names.

Indie Game Stand

We don't think there's any confusion in the part of the market this service sits in. Obviously an indie-focused store, Indie Game Stand is a bit different to most in terms of actual sales, and it offers some games in a pay-as-much-as-you-like model. There are also some free games, as well as alpha and beta versions of titles to try.

The suggested price games appear in daily deals, and paying over the average price nets you extras, which is just another way for new developers to get a leg up selling their wares.

Humble Bundle

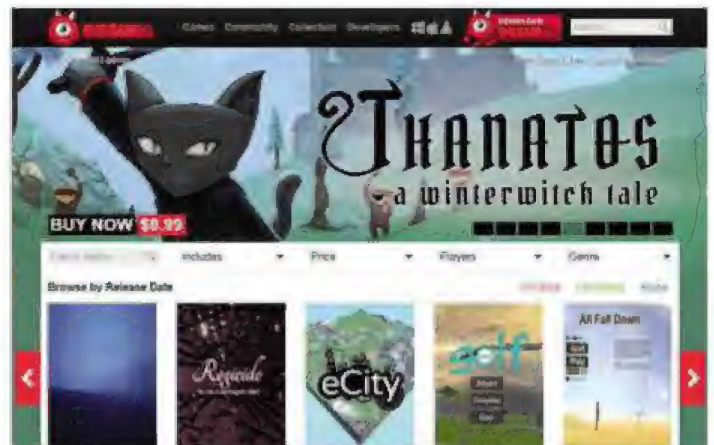
www.humblebundle.com

The most famous charity gaming store, Humble Bundle is a store focused on time limited deals that offer a whole collection of games, often big name titles and series, as well as older titles for a very low price.

You can select what you want to pay for the bundle and decide how much of your payment goes to Humble, the developer of the game(s) in question and to charity. Pay above various amounts, such as the average price, and you can get more games added to your bundle. Sometimes new games are added at a later date, and even if you've already purchased the deal, you'll be given the additional title(s). Often, Humble's games are redeemed via Steam codes, pairing it with Valve's service.

Humble Bundle has hosted some of the best deals we've ever seen, giving player entire gaming series for under £10. The site doesn't just deal in PC titles but has also dabbled in other platforms, including mobile gaming.

Humble Bundle, due to its nature, is probably the best Steam alternative in terms of overall value, because you can get some

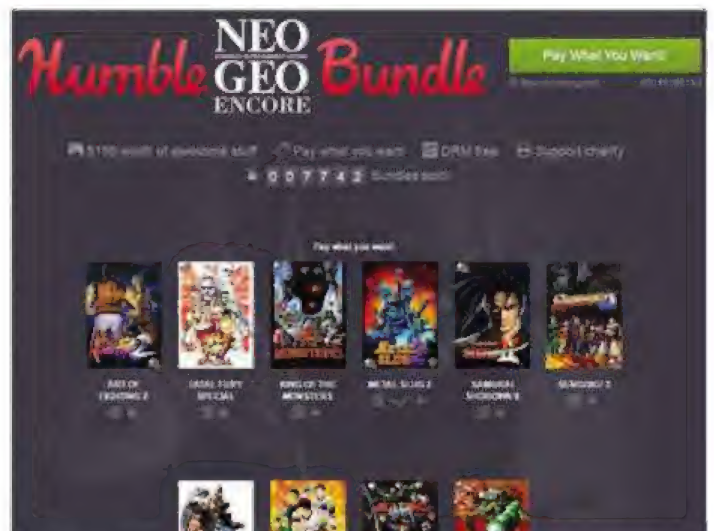


▲ Desura

killer deals, and there's the great feeling of donating to charity that goes with it, so it really is win-win. Of course, whether or not the games currently on offer are for you is purely the luck of the draw, but we really can't fault this great service, if only for the good work it does. [mm](#)



▲ Indie Game Stand



▲ Humble Bundle



David Hayward has been using Linux since Red Hat 2.0 in schools, businesses and at home, which either makes him very knowledgeable or a glutton for extreme punishment

Linux

Endless Possibilities

Reaching the world with a Linux distro

Of the seven-something billion people on this planet there are, apparently, over four billion who don't have access to a computer or an internet connection. Most of these people simply haven't got the means to get hold of technology, others, however, don't want it – or at least not as much as some folk do.

Those who can't get access, are potentially missing out on the sum of all human knowledge. The ability to belong to a global digital community, to have instant access to another person's views, opinions, lifestyle and beliefs. It's an incredible thing, regardless of the negatives that the internet and computing can often be associated with.

Linux has done much for technologically struggling communities around the world. Whether that community is in deepest Africa, in the middle of the South American rainforest or on the opposite end of the planet in India, Tibet, or even further afield. Being a lightweight, stable and – perhaps most importantly – free operating system has seen it installed on countless PCs and used by adults and children from the far-flung corners of the world to see how other members of the human race live their lives.

Endless OS

One project in particular is trying to bring as much computing to the masses as possible, through the power of Linux. Called Endless,

the project has been active for a few years now offering and distributing a \$79 computer, and raising funds to supply computers for classrooms in various poorer countries. In addition to those laudible activities, the beginning of June saw the project release its Endless OS, a heavily customised version of Ubuntu using Gnome. This distro has been specifically designed to work perfectly without the need for an active internet connection – a vital feature in many parts of the world.

You'll find the usual collection of office productivity programs as well as apps for programming, gaming, watching video, listening to music, education, image processing, encyclopaedias, maps and travel. In fact there are over one hundred pre-installed apps available within the huge 16GB ISO. Of course, if you're somewhere with limited internet access downloading 16GB isn't going to be on the cards – it barely is

here. However, the OS can also be run from an appropriate USB stick, an ideal method of distribution that can simply be inserted into a PC wherever it may be.

Linux for the world

Endless' project is certainly commendable, but it's just one element in the grand Linux community. Linux exists on most of the world's out-of-reach PCs, so Endless is hardly unique in this aspect. It does, however, bring to the fore the fact that Linux is the single universal operating system that anyone – regardless of age, sex, beliefs or where they live in the world – can use without fear of being cornered into a mega-corporation's whims, or having to provide an ultra-rich shareholder with even more money. Long live Linux then, and here's looking to a unified computing future.

▼ *Endless OS, helping to bring computing to the people of the world using Linux*



News Bytes

Sven Harvey takes a look at some of the shenanigans in the Amiga market

Emulating OS4

The latest versions of UAE – such as WinUAE, which is essentially the core of the official Amiga emulation package, *Amiga Forever* – allow the emulation of PowerPC accelerated machines. This essentially provides users an emulator with which to run Amiga OS 4.x.

A new book from Poland simply referred to as *Amiga OS 4.1 Emulation*, written by Krzysztof 'Radzik' Radzikowski will take a look at emulating a PowerPC Amiga under WinUAE and FS_UAE across Windows, MacOS X and Linux. The guide, marketed as a "complete guide not just for beginners" takes you through preparing a complete Amiga OS4.1 install to getting new applications and using packages such as AmuCygnix.

This 300 page volume is due out in August, and you can find out more at goo.gl/WcR1Jo. It will be available in English and Polish, physical hardback and e-book editions. The physical editions also come with a CD-ROM containing the software discussed in the book (apart from the commercial releases, obviously).

Enhancer Disc

The new Amiga Software Enhancer for Amiga OS 4.1 is now available on CD-ROM. Named after the marketing term used by Commodore to introduce the Kickstart ROM, and Workbench and Extras disks for AmigaDOS (now referred to as AmigaOS) 1.2 and 1.3, A-EON Technologies Enhancer Software is essentially the AmigaOS 4.1 extras disk.

Two editions exist offering subtly different editions of the included software. You can take a look at the PDF (at goo.gl/co5y37) or check out the Amiga Wiki entry (goo.gl/LVvAH4) for more information.

The key inclusions are Warp 3D Nova (a driver and graphics layer package), CANDI (a desktop compositing engine for Workbench), AmiDVD and TuneNet (a music media player.) Amigakit are carrying the product in both its standard (£50) and plus (£60) editions, and you can find out more at www.amigakit.co.uk.

Retro 7-bit

You may recall a mention of Retro 7-bit recently, and the good news is that a UK stockist is now offering its wares. In fact, AmigaKit (well who else would it be, to be honest) is now offering a few items from the Polish manufacturer.

The A500 Flash Kickstarter Switcher 1MB gives the option to switch between a real 1MB A500 Kickstart ROM chip and a flash based version to allow the use of the most up-to-date options as well as a fully compatible fall back. This unit works with the Amiga 500, Amiga 500+ and the Amiga 2000, but requires a minimum of Amiga OS 1.2.

The SUM USB keyboard adapter allows the use of USB keyboards on certain machines. The USB keyboards have to be of

the HID variety, with versions for the A600 and A1200 (separate editions) that install onto the motherboard (with potential to use a keyboard within the original case, but more likely to allow the use of an external unit) this circumnavigates the lack of availability of original keyboards for these machines. A fully external unit, with appropriate adaptors, offers options for Amiga 2000, 3000, 4000, 4000T and CD32 machines too.

Finally, an external USB to joy-port adapter, called the Rys MKII, accepts HID devices (mouse, joystick, or joypad) and converts the signals into something the Amiga can understand. It then connects via the normal 9-pin D-ports that a legacy mouse, joystick or joypad use.

Again you can check them all out at www.amigakit.co.uk or pop over to www.retro.7-bit.pl!



Kickstarter Reminder

The Story Of The Commodore Amiga In Pixels Kickstarter campaign is drawing to a close, so don't forget to pop over to the page at goo.gl/qMnFGu to take a look before it's too late. The Kickstarter campaign ends at 2:58pm on Monday 11th July 2016.



Sven Harvey has been our Amiga specialist for over 16 years, drawing on his 25 years retailing computer and video games and even longer writing about them

Amiga



Ian McGurran is a professional IT analyst, a semi-professional writer and a pretty amateur electronic musician. He likes gadgetry and loves making gadgets do things they were never designed to do

Mobile

Who's The Smartest?

Ian McGurran spends some time with Android and Firefox OS on the big screen

TVs? In the mobile bit? Yes, it's a bit odd, but the rise of smartphones and smart televisions has been a somewhat parallel affair – with the first useable streaming boxes appearing around 2009, just as the smartphone concept was gaining real traction. Boosted by powerful, smaller hardware and faster internet speeds, streaming boxes have grown into full 'smart' platforms while smartphones are now basically media centres on the move.

It has long seemed inevitable that the powerful media-capable operating systems of the mobile market would start to migrate to other platforms. I had chance to spend time with two 4K TVs, one with Android TV and another with Firefox OS, so how does the experience transfer?

Android isn't a newcomer to the TV platform. Some of you may recall the ludicrous remote control/keypad Sony supplied with the first Google TV hardware back in 2010. Back then you got a version of Android Honeycomb that acted as a go-between between your set top box and your TV. Slow and cumbersome, it died a quick death. Android TV is a bit different, closer in feel to your standard smart platforms and – importantly – it's built into the set, so will work with any inbuilt tuner. If you've used the likes of the Fire TV then the way it works will be familiar, and if you've used the Android TV box itself, or an Nvidia SHIELD then the TV version is ostensibly the same. However, like anything Android, how you get on with it is partly down to the hardware.

I got to try Android TV on a Philips 4K mid-range TV, and, as there's a HD tuner here, I got to test that side of the platform

out, something you can't do on the SHIELD or the Android TV box. Setting a TV up using Android is a bit odd, though the UI is nice and familiar. You sign in and then in the app store there is access to your Android apps that you already own, including favourites like Plex and BBC iPlayer. But, like the Apple TV 4, there are apps missing that are on the platform, such as 4OD – it's on Android, but not on Android TV as yet.

That's frustrating, but not as frustrating as using Android TV on an underpowered screen. That's a whole new level of pain, with channels and the programme guide running slowly and a few presses behind, searching only available by mic (nope, note on this remote) or by using the Android TV app (an app incapable of sending a string of text clearly). Frankly, Android OS's strengths (er... apps, it looks nice) were outweighed by being just too over complex and slow – it even controls the settings, something you want to be able to adjust quickly and not wait around for it to catch up.

Firefox OS isn't the same kind of force in the mobile world as Android is. Based around Linux with HTML5, it's very much a lighter operating system with

good web integration, and this suited the TV very well. On a Panasonic 4K mid-range TV, there were precious few stutters and hangs and the 4K apps included – Youtube, Netflix, Amazon Prime – all ran well and didn't slow the system down. The downside, however, is that there really aren't many other apps. This is partly mitigated by the Freeview Plus platform offering all catch up services, but certainly the likes of Plex would be better than the inbuilt media player.

From a wow-like point of view, Firefox OS isn't as exciting as Android TV but, unless you're using the likes of the Nvidia SHIELD or your TV has some serious grunt to it, I'd take it any day and consider a separate box for specialist tasks – especially as that leaves the TV bits, like the setup, to the TV's own software.

Smart platforms have come quite far since their inception, and they are clearly the way forward in an age where we are moving away from physical media. But in some cases all the bells and whistles come with an overhead the hardware can't handle. They need to be televisions first, smart platforms second, and the best devices, like the Panasonic, are those that put that into practice.



Et In Arcadia Ego Ludere

Andrew Unsworth ponders the future of arcade gaming

Arcade games are great, but it often feels as if the best days of arcade gaming are behind us. Whenever I go to an arcade, they're full of games that I already know and love, such as *Time Crisis*, *Sega Rally* and the legendary *Street Fighter II*, or a variation on one of those themes. All these games are an enjoyable way to waste time and money, but I also long for something new. I'm sure it's the same for you guys too.

Perhaps the most exciting thing to hit the arcades in recent years has been the dance games, those brash, bright and banging machines on which assorted yooof stamp and gyrate in an effort to prove they have the best rhythm or memory. I love the idea of these devices, but I've never been that good a dancer, and the sight of a fat, middle-aged man slapping the mat to the sounds of the latest Eurodance sensation will be enough to put the fear of old age into any witness. There are still some decent new games, though, such as *Star Wars Battle Pod*, and it's worth seeking them out.

Perhaps all the excitement about virtual reality means that the future of arcade gaming belongs to VR. Some may ask why even bother, given that we'll soon be enjoying VR on our consoles in glorious Ultra HD, but the arcades do have more to offer than a basic VR experience. From *OutRun* to *Galaxy Force 2* and the marvellous *G-LOC*, arcades

have always pushed the boundaries of gaming through the use of novel cabinets that tilt, turn and, in the case of the R-360-based *G-LOC* (youtu.be/qDr2jNo1dml), give a full-range of movement, as if you're in a fighter jet.

I find the thought of an Ultra HD or higher resolution VR headset combined with an R-360-style arcade cabinet

happening (moving up, down and all around at speed) and the lack of motion in the real world. I'm sure we'll all get used to this, though.

I hope manufacturers do continue to innovate with their arcade games and cabinets, because they were such a key part of our youth, and I want the younger generation to experience

“ I hope manufacturers do continue to innovate with their arcade games ”

wallet-damagingly exciting, and I hope plans are afoot to make such things a reality.

I recently had the pleasure of trying out an Oculus Rift headset at a trade show, and it was a great experience, and a good proof of concept for arcade VR gaming. The cabinet was a mock-up of a helicopter cockpit, and the 'game' was *MS Flight Simulator X* running on a PC that fed the graphics to the VR headset. The use of VR in combination with the helicopter-style controls (it wasn't by any means an exact replica of a chopper cockpit, just a bit of fun) made it pretty addictive, and I didn't want to come off it.

The only problem was that I felt dizzy after using it. The dizziness is probably down to the fact that I'm not used to using a VR headset, along with the disconnect between what my eyes told me was

the same sense of wonder and excitement. There's also the social aspect too. People would crowd round if you're doing well, especially if it was a multiplayer game, and by challenging each other you'd make new friends. Here's hoping arcades remain a part of the gaming scene for many years to come.



Andrew Unsworth has been writing about technology for several years, he's handy with a spanner and his handshaking skills are second to none

Hardware



Ryan Lambie has loved videogames since he first stared up in awe at a *Galaxian* arcade cabinet in his local chip shop. 28 years on, Ryan writes about gaming for Micro Mart. He's still addicted to chips and still useless at *Galaxian*

Gaming

The World's Greatest Detective

Telltale's forthcoming *Batman* game will spend as much time exploring Bruce Wayne's psyche as his masked alter-ego, the Dark Knight

This week, Ryan checks out the new details from Telltale's *Batman* game, and takes a look at the scarily brilliant skills of a teenage *Overwatch* player from Korea...

Plug & Play

We've played as Batman many times in videogames, but what about his billionaire alter-ego Bruce Wayne? That's a new avenue Telltale's exploring in its latest point-and-click adventure series later this year, with Wayne spending just as much time in his civilian clothing as his cape and mask. While *Batman: The Telltale Series* will feature its fair share of fight sequences – which, like *The Walking Dead* games, will take the form of quick time events – its greater focus will be on detective work and conversing with other characters from the DC comics.

Those characters range from Batman's allies – Jim Gordon, Vicki Vale and his loyal butler Alfred – to more shady figures like crime boss Carmine Falcone, Selina Kyle and Harvey Dent. With the latter villains around, you can bet their villainous personas (that'd be Catwoman and Two-Face) will make an appearance over the course of *Batman*'s five-episode run.

Like other Telltale games, there'll be multiple paths through the story – but, cleverly, much will depend on the version of Bruce players decide to present to the world. In other words, the responses players

choose during conversations and other confrontations will define how Bruce is perceived by the characters around him; Bruce can be passed off as a shallow member of the elite more interested in partying than politics, or a kindly philanthropist, say. There will also be specific moments in the game where we'll be able to decide whether we want to play as Bruce or Batman, which are sure to affect how those scenes pan out.

We've seen games touch on the 'Detective Comics' side of Batman in the past – Rocksteady's *Arkham* games had splashes of high-tech sleuthing between the fist-fights – but a Dark Knight adventure that is almost entirely focused on brains rather than brawn could make for something new and fresh. Also, while Telltale says it isn't basing its series on one particular incarnation of Batman, the cel-shaded, heavily stylised art style gives it the look of a moving comic book. It isn't hard to imagine Frank Miller's classic comic *Batman: Year One* suiting Telltale's cerebral tone – *Year One* even features a similar roster of characters to Telltale's Batman – though the studio hasn't yet divulged any specific details about the story itself.

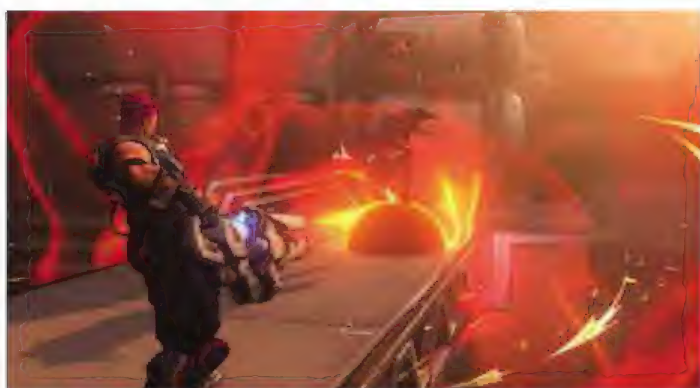
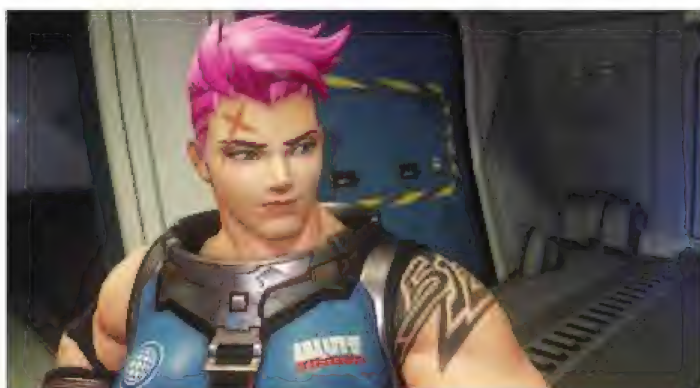
"It starts in a familiar place," Telltale boss Kevin Bruner told *The Verge* at this year's E3, "but it doesn't end in a familiar place."

The first episode of *Batman: The Telltale Series* is due out this summer.

Online

Overwatch may only have been out in the wild for a matter of weeks now, but it's managed to rack up around 10m players worldwide, and in Korea, the shooter's second only to *League Of Legends* as the most popular online game in that part of the world. One of the best *Overwatch* players on the planet recently emerged from Korea: 17-year-old pro gamer 'Geguri'. Her skills are so spectacular, in fact, that some rival e-sports gamers were convinced she was cheating, and were so certain of it that they were willing to quit playing *Overwatch* altogether if they were proved wrong.

The storm began during the qualifying stages of the Nexus Cup, when Geguri and her team UW Artisan managed to beat some of the best gamers in Korea. Suddenly, a player who most in the male-dominated realm of e-sports had never



▲ Korean gamer Geguri's *Overwatch* skills are such that she was briefly accused of cheating to achieve her extraordinary kill-rate. But no, she really is that good

heard of was ranked eighth in the world. The stats speak for themselves: Geguri's won 80% of the 420 games she's played, and has a kill-to-death ratio of 6.31:1 – which means that, for every time she's been killed in *Overwatch*, she's taken out a shade over six rival players. After Geguri showed off that prowess with her chosen *Overwatch* character, Zarya, in the Nexus Cup, two rival players began to suspect they had a cheat in their midst. Geguri seemed to have the ability to hit a target dead-centre with freakish accuracy. Could it be that she was using

some kind of aim-assist hack to achieve those extraordinary stats? Pro-gamers Strobe and ETLA, from a team named Dizziness, certainly believed so, and publicly stated that they were willing to quit if they were wrong. More disturbingly, it's alleged that Strobe threatened to turn up at Geguri's house with a knife if she was unmasked as a cheat.

The manager of Geguri's team got on the phone to Blizzard Korea, who were able to confirm that the player hadn't cheated in any of her games. That conversation was even recorded and posted online, but it still

wasn't enough to silence the accusers. There was only one thing for it: a live demonstration. On 21st June, Geguri showed off her skills in an hour-long game, which was streamed on Twitch and elsewhere as it unfolded. Sure enough, the player proved to be as brilliant as she claimed: fast and disturbingly accurate.

In the face of that evidence, Strobe and ETLA quit both their team and *Overwatch*, and apologised for branding the player a cheat. As for Geguri, she's now officially one of the most accomplished players of a game that is rapidly becoming the darling of the e-sports scene. If *Overwatch*'s enormous popularity continues, more tournament wins are sure to beckon.

Incoming

Overwatch may be dominating the online shooter scene right now, but design celebrity Cliff Bleszinski's hoping his team's forthcoming *LawBreakers* will be able to give it a run for its money. Not that he's particularly keen to lump the colourful *Overwatch* in with his grittier,

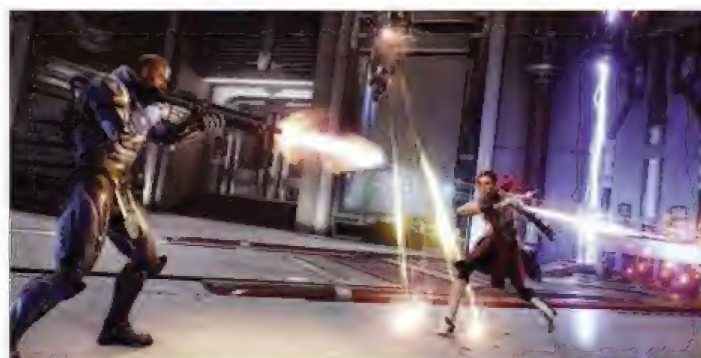
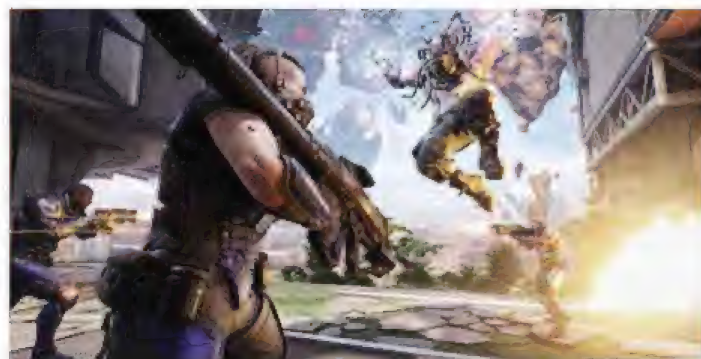
more hard-edged sci-fi shooter, which distinguishes itself with its zero-gravity battle arenas.

"When people see something, they immediately want to put it in a bucket with something else", Bleszinski recently told *Eurogamer*. "And them, as a game, are so much rock-paper-scissors. And for us, you know, if I come around the corner in *Overwatch* and I have the wrong character, and someone else has the right character, in that rock-paper-scissors match, I'm dead."

Bleszinski also claims that solo players will have a lot more chance of taking out larger teams of players if they have sufficient skill – something he says is nigh-on impossible to achieve in *Overwatch*.

"In *Overwatch*, if I enter a room with four, five, six people from the other team, I don't stand a chance of really taking them all out. If you're really good at this game with any of the different roles and classes, you can take out an entire team."

There's no release date for *LawBreakers* yet, though its recent closed alpha phase could mean it's not too far away. **mm**



▲ Can *LawBreakers* carve out a niche in a hero shooter market dominated by the likes of *Battleborn*, *Paragon* and especially *Overwatch*? Designer Cliff Bleszinski certainly thinks so

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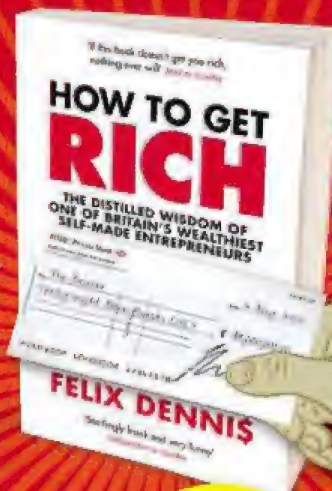
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WANTED: Tape drive backup.
Either DAT320 or later generation LTO system in good condition. Please contact me.
Tel: (07949) 407022 Email: tape.20.odaily@spamgourmet.com

WANTED: You bought a Corsair water cooler, with a square block. You fitted it to your Intel processor. You want to make a few pounds from the spare A.M.D. bits? Contact me!
Email: johnrpeel@gmail.com

WANTED: Gigabyte GA-Z77X-D3H motherboard wanted.
Email: johnbeiry@gmail.com

WANTED: PC Tower case (beige colour if possible) to rehome an Amiga A1200 vintage computer. The Amiga motherboard is H 410mm x L 190mm (H 16" x L 7.5"). PSU not an issue but if available 250 watt more than enough.
Tel: Bill (07742) 061569 or (02641) 769503.

WANTED: 3G dongle for Archos 80 G9 tablet.
Email: alancox28231@gmail.com

SOFTWARE FOR SALE

Sim City 2000: Boxed and original. Classic gaming. £15.00
Tel: Gordon (01314) 660205 Email: scobie09@gmail.com

Adobe Photoshop Elements and Premiere Elements 12 Full Version - Windows/Mac. Original Boxed CD with unused product key. £47.50
Tel: Ian (01932) 856971
Email: a2345@btinternet.com

PCB design software. 127 layers, schematic entry, PCB entry, PCB to Gerber file converter, output to printer. £9.99
Tel: Nigel Wright (07967) 527693
Email: cresswellavenue@talktalk.net

Microsoft Office 2013. Original Software only £100.
Tel: Gordon (01314) 660205
E-mail: scobie09@gmail.com

Cyberlink PowerDVD 12 Standard. Runs under Windows 8, 7, Vista or XP. Original CD with unused product key £7.50
Tel: Ian (01932) 856971
Email: a2345@btinternet.com

Nuance Omnipage 18. OCR; Windows 8, 7, Vista or XP, Original CD with unused product key £25.
Tel: Ian (01932) 856971
Email: a2345@btinternet.com

Acronis True Image Home 2012. Bootable CD. Application runs under Windows 8, 7, Vista or XP. Original Acronis CD with unused product key £5.
Tel: Ian (01932) 856971
Email: a2345@btinternet.com

Norton Family Premier 2.0. Runs under Windows 8, 7, Vista or XP, Original Symantec unused product key £15.
Tel: Ian (01932) 856971
Email: a2345@btinternet.com

SOFTWARE WANTED

Good Text to Speech program WinXP or 7 to read ebooks aloud for a pensioner with few resources.
Tel: Wilf James (01767) 699809

Wanted: PictureToExe software, for making picture shows.
Tel: (01202) 610602
Email: ivor.mary@talktalk.net

Wanted: Quicken 2001. I desperately require a copy of QUICKEN 2001, UK Edition. I need to reinstall the program but have lost my original installation CD.
Email: david.maddams@icloud.com

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- When sending out goods, at the least obtain a certificate of posting from the Post Office

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ASK AARON



Meet Aaron Birch. He's here to help you with any general upgrading, software and system building problems. He's got advice aplenty and you're very much welcome to it!

Send your questions to:
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Micro Mart
Dennis Publishing
30 Cleveland Street
London
W1T 4JD

Contact Aaron by email at:
aaron@micromart.co.uk

Please try to keep your queries brief and limit them to just one question per letter, simply so we can squeeze in as many as we can each week. Please include relevant technical information too.

Aaron

Self Removal

Regarding Security Conflict from Kirk in issue 1419, you could also have mentioned AVG's own uninstaller which is available on its website. I have used this in the past, with great success, to get rid of residual entries that a standard uninstall leaves behind.

Glenn

Thanks for the suggestion Glenn. Indeed, a good way to remove any troublesome AV application is to check the developer's own website. As antivirus apps are inherently very invasive in terms of wrapping themselves up in your system, they can be very tricky to remove, at least fully on a system level. Even using the standard Add/Remove Programs uninstaller, which is fine for most programs can leave behind traces of the app. These remnants can then cause problems for any future AV installation.

The dedicated removal tool you mentioned from AVG will correctly remove any and all references to the app, making sure your system is clean of the old software, leaving a nice easy install for any future replacements. It's not just AVG that offer this either. McAfee has its own removal tool available, available from intel.ly/28VBDPX, which will remove all McAfee products from your system – and Symantec also has a tool to remove its apps. You can can

get this from Symantec, but you must first contact the company's support and open a case. It's not available as a standard download, and must be supplied to you.

It's always worth checking the software developer website in instances like this, as you may often find official help that can make your life much easier.

▼ **AVG can be difficult to uninstall at times, so the official removal tool can be very handy**



Temporary User

I've hit a really big snag with my Windows 8 PC, one that's stopped me using it altogether. A few days ago I logged on to my PC as normal, but when I got into Windows I was told via a pop-up that I'd been logged on using a temporary profile. It said any changes made would be lost when I logged off. I also couldn't find any of my desktop items, or any of my documents.

I tried logging on a couple more times, but each time I was greeted with the same error, and again I was unable to make any permanent changes, and could still not find any of my documents.

I'd appreciate your help in getting my PC working properly, and if you could get me access to my files again, that would be grand. I'd really like to be able to get back onto my PC, and if I could do so without losing any data, that would be fantastic.

Steve

The temporary profile error you're getting is usually triggered if the profile you're trying to log on with is damaged or corrupted. If this

is the case, you're provided with a temporary profile so you can still log on to the PC, and hopefully, fix any issues. This profile is read-only as it's only temporary, so no permanent changes can be made as it's wiped when you log off.

If a profile is corrupt, it's usually not easy to fix, if it's possible at all. The most common solution is to simply create a new profile, and then copy data from the older corrupt profile to the new one, prior to the deletion of the previous entry.

To do this, you'll first need to backup any data from the old profile, so log on as an administrator account and navigate to c:\users and locate the folder for your old profile. Go into it and back up any information to another folder elsewhere.

Next, we need to do a bit of Registry Editing to remove references to the old, damaged profile. So, press WIN+R, type 'regedit' and press enter. In the Registry Editor navigate to HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows NT\CurrentVersion\ProfileList.

Here you'll see a list of profiles on the system, identified by their SID number. This

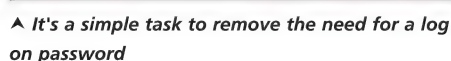
I should note that not all users have the built-in administrator account enabled on their PCs, which may mean you have no accessible admin account available to attempt the above fix. If this is the case, you'll need to enable it. This is easy, and can be done in a few ways. The easiest is the command prompt method.



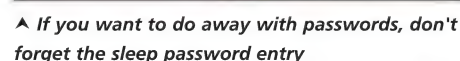
This command will enable the built-in admin account, which you can then use to perform the steps detailed here to fix the corrupt profile.

My user details aren't linked to a Microsoft account, as I preferred the option of setting up a local user in Windows 8, so I don't have to worry about any online problems. I hope you can help.

This will remove the need to type in a password to log on for any user of the



and change its plan settings, and then go into advanced settings. Expand the list and locate the option for password requirement in wake-up. When you do, change it to No and click Apply. This will now remove the need for a password if your PC goes to sleep.



ASK JASON



Meet Jason D'Allison, a veteran of Micro Mart's panel of experts. He's here to help with any technical questions, including anything to do with tablets or smartphones, as well as PCs

Send your questions to:
Jason D'Allison
Micro Mart
Dennis Publishing
30 Cleveland Street
London
W1T 4JD

Contact Jason by email at:
jason@micromart.co.uk

While we try to cover as many questions as we can, we regret that Jason cannot answer your questions personally, but he'll cover as many as he possibly can each week. Please ask one question per letter and remember to include the full specification of your computer, including its operating system.

Jason

On The Big Screen

I'm in the market for a new phone, and I'm considering Microsoft's Lumia 950. I know this runs Windows 10 Mobile, which has a reputation for being a disaster, but my brief play with it has been positive. I'm particularly interested in the Continuum feature, which I believe would let me connect my phone to a monitor and use it like a PC, with keyboard and mouse. However, does the 950 actually support Continuum? Some information seems to suggest only the 950 XL, the bigger model, can do this trick. Also, would I be able to install standard Windows programs?

N Harvey, Gmail

Yes, the Lumia 950 supports Continuum. In theory, Continuum is compatible with nearly any Windows 10 Mobile device with at least 2GB of RAM, 16GB of storage, a 720p resolution and a Snapdragon 617, 808 or 810 SoC. The external screen is hooked up via the wired Display Dock or the wireless ScreenBeam Mini2.

Perhaps the main draw of Continuum is being able to use Office on a full-size screen. This is the mobile Office, not the big-daddy PC edition, and ironically the Android and iOS versions are superior. Sadly, no, you won't be able to install standard PC programs. Continuum will work with all apps that show up in

your phone's Windows Store, but the cupboards in there will be sadly quite bare (is that poetry?). Also, few apps are specifically tailored for keyboard and mouse.

The major hurdle for Continuum is that Microsoft's phones, like almost all other phones, are ARM-based. Nearly all PC programs are x86-based. Microsoft hoped to transition its phones to Intel's x86 Atoms, but Intel has pulled the pin on those. I think the future of Continuum lies pretty much solely with Microsoft's Surface devices, which run laptop hardware.

Microsoft's great hope was UWP – the Universal Windows Platform. This allows developers to write software in Visual Studio that'll work, with little if any modification, on both Windows 10 (x86) and Windows 10 Mobile (ARM). But developers have hardly been falling over themselves. There was supposed to be bridge software, Astoria,

that would let Windows 10 Mobile run apps written for Android, but that's been shelved. Also, near-silence has descended over Islandwood, a similar framework for iOS apps.

Windows 10 Mobile is a great OS – as was Windows Phone 8.x – and if you know what you're getting into, by all means buy a Lumia 950. It's a lovely device. Just be under no illusion about the limitations. Will Microsoft withdraw from the phone market? It's possible. Recently, I had an email saying I needed to update the PayPal app on my Android phone. The email made plain that no such update was available for Windows users (or BlackBerry 10 or Fire OS users) – and older versions have stopped working. When companies the size of PayPal have given up, is there any hope?

▼ Continuum is clever, but it's a trick most users will tire of very quickly



Key To Success

A few weeks ago, I accidentally knocked a can of Coke over my Acer Aspire E1-571. Bang! I had the motherboard replaced, but then the keyboard gave me grief – some keys on the right-hand side didn't function. I've taken the laptop back to the repair shop and had a new keyboard fitted, but while all the keys now work, every so often text I've typed will suddenly disappear. It's as if the backspace key's stuck, though physically it looks fine. Do you think the laptop's simply had it? Should I just buy another?

Peter, South Lanarkshire

Don't you dare buy another laptop, Pete. Not after you've invested so many pound notes in the current one. * True, I've known laptops where the keyboard controller – a feature of the I/O chip on the motherboard – has become frazzled, but it's rare. In your case, the keyboard fault now is different to the one before, yet if the controller were the culprit, surely the fault would remain unchanged.

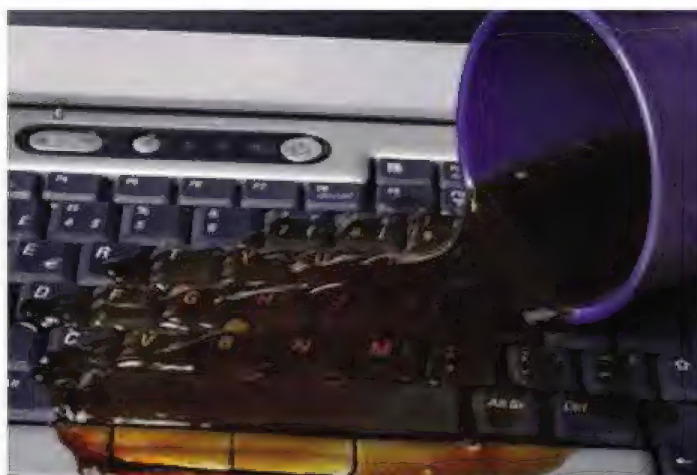
Another keyboard is all you need. Keyboards sold to end-users are typically made for peanuts and go through little or no quality control. Most turn out fine, but duffers are bound to

slip through the net. I'd say yours is one of them, or maybe it got twisted during installation or somewhere along the delivery chain.

Now, by rights you should be able to have the keyboard replaced for free at the repair shop. But if the owner starts playing games and you really can't be bothered to push for justice (take your business elsewhere in future), simply do the job yourself. A new E1-571 keyboard can be had for just £7.99 (including delivery). Here's an example: goo.gl/PDgJzs.

With some laptops, replacing the keyboard is a process drawn up by the devil. Thankfully, on your Acer, Pete, it's a perfect doddle. Crikey, you won't even need a screwdriver. All you'll have to do is push down a few clips and unhook a ribbon cable. The job'll take about 15 minutes – tea-break included. Here's a video tutorial to help you along: goo.gl/4lsYJC.

* For readers unaware, Scotland does in fact still have pound notes (issued by the Royal Bank of Scotland).



▲ Er...

All Killer, No Filler?

I'm building a gaming PC, and it's time to choose the motherboard (LGA 1151). Quite a few boards, especially from MSI, have Killer LAN controllers and make a big song and dance about less lag and more bandwidth. How does the reality compare to the hype? Is a Killer LAN controller worth getting, or would it be no better for online gaming than a common-or-garden affair from, say, Intel or Realtek?

– serious players – who just stick with standard wi-fi, which historically was an absolute no-no for online gaming.

Ultimately, Luke, buy the motherboard with the best overall feature-set in your price-range, and don't be swayed by features you're never going to use. Also take into account reliability (personally, I'd always plump for Asus over MSI). If your ideal board has a Killer LAN controller, great, but if it doesn't, I can't think you'll think twice about it once you're up and running.

Luke, Gmail

▼ Anyone remember the Killer NIC?

Originally, Killer LAN controllers came on PCI and PCIe cards. The theory was that a LAN controller integrated on a motherboard was a burden on the PC's CPU and was hampered by the Windows TCP/IP layer. Killer cards had their own network processor and software (they ran an embedded Linux distro). Did they live up to expectations? I confess I don't know, but I certainly hope so – at launch, in 2006, they cost about £200!

These days, PCs have so much oomph on tap that dedicated network processors make no sense. So Killer controllers are now motherboard-based and are actually just tweaked Qualcomm Atheros controllers – maybe they're even totally stock. The selling point is the custom driver and network manager.

So – killer or filler? That's the question, eh, Luke? The results are positive in this in-depth Tech Report review of the E2400 controller: goo.gl/EGWYIc. There are healthy improvements to both latency (lag) and bandwidth. This is achieved through traffic-shaping or QoS (quality of service), where the Killer network manager gives priority to gaming traffic and shunts all other traffic to the back of the queue. The case for the older, E2200 controller isn't as clear-cut, and not all reviews of the E2400 are favourable.

Of course, performance of a network depends heavily on how many people are using it. Killer or no Killer, performance will nose-dive if others are gaming at the same time or, perhaps, streaming HD movies. And no matter how good the performance at the user's end, there could well be bottlenecks at the ISP or server end. I know some pretty good gamers



Crowdfunding Corner

We know we often give mobile-focused projects a lot of prominence in Crowdfunding Corner, so this week we've got a treat: a pair of projects as PC-focused as any could ever be

The Z: The Most Advanced Gaming Mouse Ever Made

Swiftpoint's last Kickstarter project for a touch-enabled mouse won an innovation award at CES, so you can bet its attempt at a gaming mouse is going to be something worth paying attention to. It's been in development for three years, and it's the first gaming mouse that incorporates pivot, tilt and roll controls, as well as analogue sensors on the buttons, so you can configure it to recognise how hard it is you're clicking.

Inside you'll find an accelerometer, gyroscope, force sensor and tactile feedback elements, so you can create a faster, more complex and yet more intuitive set of controls for every game. In total, there are 80 different ways to 'click' the mouse, so you'll never want for extra controls. The specs are as good as any mouse, with a 200-12,000dpi sensor, 1000Hz polling, a braided cable, and even an on-board OLED screen so you can configure it.

The mouse is available for \$139 (£95) to early bird backers, which is \$90 (£66) off the RRP. At higher payment tiers, you can get multiple mice at a larger discount, so if you have a friend who might also be interested in gaming precision, it's time to give them a call! With 42 days to go and more than half of the goal achieved, it's surely going to be a big hit.

URL: kck.st/29a1pQW

Funding Ends: Friday, 12th August 2016

WiReboot

If you've ever been annoyed by your router suddenly dropping out and needing to be rebooted – and who hasn't? – then the WiReboot might be the accessory you need. This simple USB device plugs in between your router's power supply socket and the wall socket and connects to the internet so it can monitor your connection. If it drops for long enough, the WiReboot will automatically hard reset your router.

It's compatible with virtually all routers and open source, so you can modify the control software yourself if you're into that level of modification. You can also use it to remote reboot other devices; as long as they have a compatible power supply, you can control it over your wireless connection.

You can get one of the devices for as little as £10, though versions with extra sensor modules (radio, light-sensitive, temperature) are available at higher prices. The project ends in August, and if all goes well it's scheduled to ship in September 2016.

URL: kck.st/297PDoe

Funding Ends: Monday, 1st August 2016



Disclaimer: Images shown may be prototypes and Micro Mart does not formally endorse or guarantee any of the projects listed. Back them at your own risk!

App Of The Week

Prism

Mind-bending puzzles in an equally complex micro-universe

While I'm quite addicted to clicker, idle games and tower defence type games, I also occasionally like to stretch my mind and engage in a spot of puzzling.

The mobile platform does have quite an extensive range of puzzle games to choose from, with some being quite extraordinary. *Prism* (stylised '_Prism') is one such title – a 3D puzzle game that has you solving shape-based conundrums with geometric patterns in a microcosmic galaxy.

Shifting Shapes

The idea behind *Prism* is that you manipulate all manner of geometric shapes to unfold further shapes, which in turn will unlock the glowing heart of the shape. Once the heart is exposed, it'll feed a central atom, if you will, with its power, and when all the shapes (in this case the sub-levels within each stage) are active, you can move on to the next stage.

The first things that strike you with *Prism* are the large, beautifully rendered graphics. The shapes morph, move, expand and blossom out in a zero-gravity

environment. You're tasked with moving the shapes around the screen and working out the puzzles that appear on each face of the geometric shape.

The puzzles themselves aren't too difficult, but they're enough to make you pause every so often and figure out the 3D world in which they inhabit. Mainly you'll have to match a pattern, and rotate, expand or move a fixed two-dimensional pattern onto the corresponding face of the shape. For example, two orange and a single blue hole set in a Y-formation will need a matching pattern to fit to it. You can then rotate and move the pattern in place and thus complete the puzzle and unlock a new puzzle on a previously untouched face of the shape.

It's not as linear as it sounds, though, as the shape itself can suddenly morph into something completely different from its original dimensions, leading you to start again with a different set of puzzles, some of which soon become layered within each face of the shape.

Remarkably, all this was created by a lone developer, Clint Siu.

Features At A Glance

- 13 enchanting levels totalling about an hour of gameplay.
- Original, zen-like soundtrack.
- Rotate, pinch and zoom to capture the universe through your own personal camera lens.
- Based on the classical elements, each piece of sacred geometry is a symbol for the elements that build up our lives and our world.

It's Pattern Forming

There's plenty to keep you hooked to the screen with *Prism*. The ambient music and sound effects are subtle but keep your ears entertained, and the puzzles are neatly presented, with a substantial number of twists and turns to get your grey cells working.

While there are numerous other and more challenging puzzle games available, *Prism* combines a good mix of all the necessary ingredients to hold you. It's intelligent and marvellously designed.

It's currently available for both Android and iOS, costing around £2.47. [mm](#)



▲ The puzzles in *Prism* can be quite complex



▲ It's set in a microcosm universe, with core elements and secret energies



▲ Each new face of the geometric pattern offers a new puzzle

Logging Off

In the first week in June I got an email from Microsoft's PR people in the UK, banging the drum about how Bing correctly predicted the outcome for all 15 knockout matches at the last World Cup. And, now it was back to call the Euro 2016 competition with equal aplomb! So, using its powers of 'social media analysis, online search and performance evaluation' how did it do?

Well, I'm writing this just after the group stages, but it isn't looking good for Bing as the results stand so far, because it predicted that England would triumph in the group stages, topping Group B with seven points from the three matches – including a draw against Wales. Keeping score that's a wrong, another wrong, and totally... Wrong.

It then said we'd take on Turkey in the next round, that's also wrong, as it was Iceland, and that we'd then play Portugal if we win, which we wouldn't have even if we had won.

Bing also had bad news for Northern Ireland's team, predicting a whitewash for Northern Ireland in Group C, and not the 2-0 win against Ukraine that saw them progress to the last 16.

Wales hadn't been following the Bing script either, because they were set to get just two points and come third in Group B, not top the table.

Microsoft included in this press release, that Bing had 'successfully predicted the outcome for events including the Scottish Referendum, FIFA World Cup, Oscars, and Cricket World Cup and are looking to score again for this year's Euros'. However, the score is at least 7-0 in favour of reality over Bing's crystal ball.

Bing's predictions that England will go out to Spain in the semi-final stage couldn't seem more laughable now, though Germany could still win the tournament – an eventuality that has a 25% chance with most bookies, given the German's track record at these events.

If Bing had predicted that Leicester would win the Premiership last year or that one of the biggest grossing films of the year would be *Deadpool* then I'd take it more seriously. It didn't, though, did it?

I also pointed out to the person who distributed this guff that Bing also predicted that the Patriots would win the last Super Bowl, and they even didn't make it that far.

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The reality is that, if Bing was so good at getting these things right then it would kill sports betting surely, and I see no evidence of that. Yet, Microsoft has poured billions into Bing, and it's got about 20% of searches – though exactly how is up for debate, because few people I know have ever used it, even by accident.

Recently Microsoft altered Windows 10 so that you couldn't redirect the internal searches, that the likes of Cortana uses, to Google, clubbing themselves some extra traffic from the unwary (and fans of a gimmick), while in the USA it introduced Bing Rewards back in 2010 to actually pay people to use it. You probably wouldn't do that unless you suspected that, otherwise, they probably wouldn't.

If Bing is the technological pinnacle of machine learning so far, Judgement day and the machine uprising has probably been postponed indefinitely on this performance, and you can quote me on that prediction.

Mark Pickavance

LAST WEEK'S CROSSWORD

Across: 7 Garry Kasparov, 8 One-Off, 9 Inkjet, 10 Shuffle, 12 Brits, 14 Pango, 16 Chiasma, 19 Spot On, 20 Thorny, 22 Impulse Buying.
Down: 1 Gain, 2 Cry Off, 3 Skiffle, 4 ASDIC, 5 Hacker, 6 Momentum, 11 Heat Pump, 13 The Tube, 15 GitHub, 17 Anonym, 18 Angst, 21 Nano.

DISCLAIMER

The views expressed by contributors are not necessarily those of the publishers. Every care is taken to ensure that the contents of the magazine are accurate but the publishers cannot accept responsibility for errors. While reasonable care is taken when accepting advertisements, the publishers cannot accept any responsibility for any resulting unsatisfactory transactions. Whatever your political stance, it's hard to argue that it hasn't been a funny old week - funny, but not in a 'ha ha' kinda way, and certainly not all that much fun to watch. Of course, this being the connected modern world we live in, getting a sense of how other countries see Britain and its politicians is one of the more uncomfortable aspects of the

whole affair – and that's before we get to the collective snigger that reverberated around Europe when England, the home nation that appears to have been largely behind the Brexit vote, was unceremoniously ejected from Euro 2016 by the might of Iceland [of course, to a large number of you, that last bit will have been a bit of a highlight]. Of course, the output of Facebook and Twitter is best taken with a pinch of salt, but the incredulity with which it appears that our democratic process has been viewed with around the world has been uncomfortable to trawl through at times. Oh, well... while the political fallout of June 23rd is sure to rain down on us for some time to come, it's seems time to do what the British do so well: make a nice cup of tea, dunk a biscuit and get on with making the best of it.

THIS WEEK'S CROSSWORD

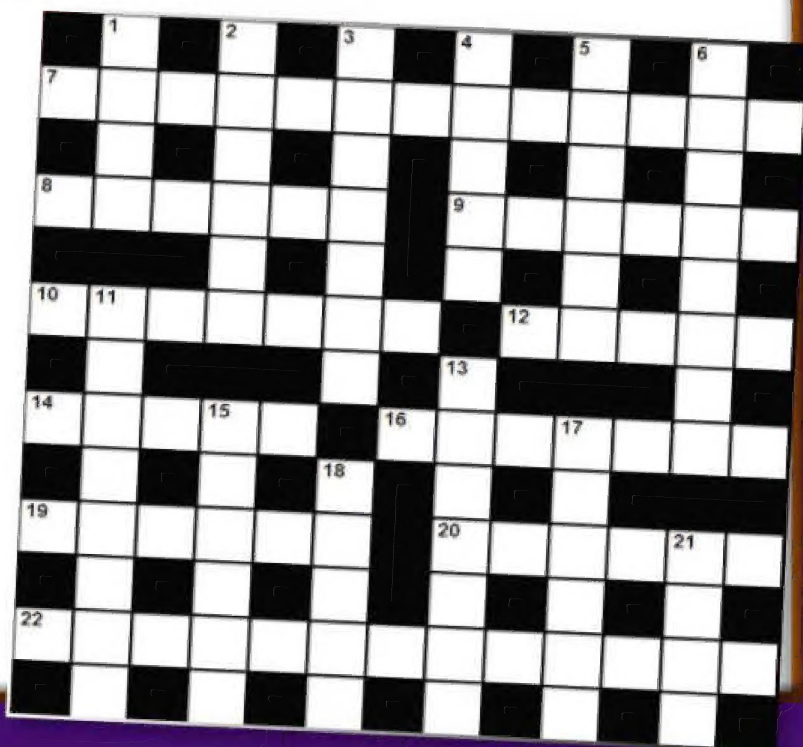
Across

- 7 The practice of regulating network data transfer to assure a level of performance, or return on investment. The practice involves delaying the flow of packets that have been designated as less important. (6,7)
8 A small rocky island, usually defined to be too small for habitation. (6)
9 An island in southeastern Asia 100 miles off the coast of mainland China in the South China Sea - noted for its tech companies. (6)
10 In gaming a bonus which a player can collect and which gives their character an advantage such as more strength or firepower. (5-2)
12 Generally incompetent and ineffectual. (5)
14 Major Tim - the first British E.S.A. astronaut. (5)
16 In the context of war, a form of deception in which one side promises to act in good faith with the intention of breaking that promise once the enemy is exposed. (7)
19 A space or container from which the air has been completely or partly removed. (6)
20 In music meaning 'too much.' (6)
22 The amount of money that a country's government has borrowed,

typically issued as bonds denominated in a reserve currency. (9,4)

Down

- 1 Framework for holding objects; servers for example. (4)
2 Burkhard-Keller's data structure engineered for quickly finding near-matches to a string. (6)
3 Remain living in or positioned at a certain place rather than moving. (4,3)
4 #FFFFFF or (255, 255, 255) (5)
5 One of a number of things from which only one can be chosen. (6)
6 Broadband without artificial download limits or restrictions. (8)
11 A symbol or function representing a mathematical operation. (8)
13 A sensation of whirling and loss of balance, associated particularly with looking down from a great height. (7)
15 A lithostratigraphic unit in the subsurface of large parts of west and central Europe - mainly marls and sandstones. (6)
17 Influential British engineer and hydrodynamicist (1810–1879) (6)
18 Incorporate text or code within the body of a file or document. (5)
21 A private telephone switchboard. (Acronym) (4)



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